PESTICIDES
in our Communities

Choices for Change

CONCERN, INC.

About This Booklet

The purpose of this publication is to raise public awareness of the pervasiveness of pesticides in our communities and to provide information about pest control methods that are least harmful to human health and the environment. It encourages citizens not only to adopt new habits at home but also to become active in pesticide issues and policies in the community.

This is the latest in CONCERN's community action guide series which includes *Hazardous Waste* (out of print), *Groundwater*, *Drinking Water*, *Farmland*, *Waste: Choices for Communities*, *Household Waste: Issues and Opportunities*, and *Global Warming and Energy Choices*.

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We are especially grateful to Cynthia McGrath for her editorial help, to Lane Avera and Petra Volkmann for their research assistance, and to Anne Heilman and Maggie Knaus for their generous contributions of graphics to this publication.

We would also like to thank the following individuals for their thoughtful review of the manuscript: Susan Cooper, National Coalition Against the Misuse of Pesticides; Norma Grier, Northwest Coalition for Alternatives to Pesticides; Lawrie Mott, Natural Resources Defense Council; Dr. David Pimentel, Cornell University.

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ISBN 0-937345-09-1

printed on recycled paper with soy-based ink

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This publication is made possible through the generous support of the Hillsdale Fund, the Wallace Genetic Foundation, and the many generous contributors to CONCERN.

April 1992

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The Issue

Most of us are unaware of the extent to which we are exposed to pesticides in and around our homes and throughout the community. Nor are we aware of the often extreme toxicity of these chemicals. It is becoming increasingly clear that the pesticides we use in our daily lives can be more of a threat to our health and the environment than the pests themselves.

Our decisions about using pesticides are driven by degrees of tolerance for pests, aesthetic considerations, health regulations, and other factors. Some pests are merely nuisances. Others such as rats and termites can seriously threaten human well-being or property. Nonetheless, our pervasive use of pesticides causes adverse effects to humans and domestic animals, wildlife, soil and air quality, and our nation's water supplies.

Pesticides are poisons. In humans, they can cause severe illness. They can have serious immediate effects, such as nausea or convulsions, as well as long-term effects such as cancer and reproductive damage. Throughout all stages of production, distribution, use, and disposal, pesticides can cause chemical contamination. Yet every day many people use them routinely, without questioning their impacts on health or the environment.

It is primarily because pesticides are so easily and widely available in the marketplace that the public, for the most part, believes that sufficient information about these chemicals exists. On the contrary, numerous questions remain about their impact on living organisms and their persistence in and potential for long-term effects on the environment. No pesticide is without risk. Very few pesticides on the market have been completely assessed for all of the health effects now required to be tested for by the US Environmental Protection Agency (EPA). Furthermore, few studies have been conducted to determine potential effects on high risk populations such as children and the elderly. However, we do know that as a result of widespread exposure each of us is carrying traces of a number of pesticides in our blood and/or fatty tissue. We also know that a number of cancers and other diseases which could be related to chemical exposure are increasing.

We can choose whether or not to use pesticides at home. As community members, we can become informed about and active in those decisions that affect their use in public buildings, commercial establishments, private agencies and institutions, on parks, playgrounds, and utility rights-of-way. As consumers, we can express our preference for pesticide-free food and nontoxic household products through our choices in the marketplace. As citizens, we can advocate changes in federal laws and local ordinances to reduce or eliminate pesticide use. As parents, educators, colleagues, and concerned citizens, we can promote the use of least-toxic control methods or alternatives that are effective, nontoxic, and nonpolluting.

Pests can be managed to a degree where we can live with them without the use of pesticides. This booklet will present an overview of pesticide exposure and alternatives to pesticide use in the home and community.

Key Questions About Pesticides

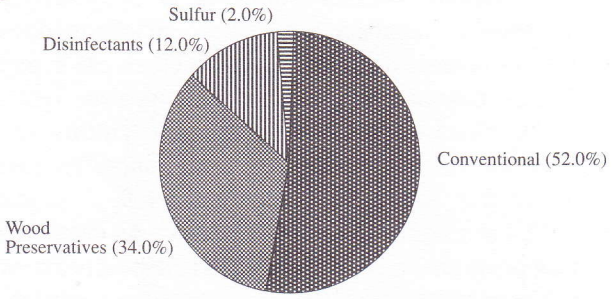
What are pesticides?

Pesticides are poisonous chemicals designed to kill or repel pests. They include insecticides, herbicides (designed to kill weeds), fungicides, and rodenticides (designed to kill rats, mice, and other rodents). According to EPA, there are now about 23,000 registered pesticide products.[1] Many of these such as disinfectants and wood preservatives are not commonly thought of as pesticides. (See graph.)

What constitutes a pesticide?

Pesticide products contain "active" ingredients designed to harm the pest and "inert" ingredients (often over 90% of the product) which act as agents to deliver the active ingredients to the pest — propellants, for example. The inert ingredients are often as toxic as or more toxic than the active ones but are not required by the government to be included on the product's label. Examples of "inerts," which are often claimed as trade secrets by the industry, include such toxic substances as toluene and xylene.

TOTAL US PESTICIDE USAGE – 1989



Source: US Environmental Protection Agency

Where are pesticides used?

In addition to use on the nation's crops, they are used in homes, schools, hospitals, restaurants, grocery and other stores, on lawns and gardens, parks, playgrounds, golf courses, rights-of-way, and in many consumer products. Almost 70 million pounds are applied to lawns annually.[2] Each one of us is exposed to pesticides, usually without our knowledge or consent.

Do pesticides work?

If pesticides reach their target pests, they are generally effective. Delivery of the pesticide, however, is difficult. When sprayed aerially, often very little of the pesticide applied reaches intended pests. Direct ground spraying is more effective, but still much of the pesticide drifts far beyond its mark.

There are other serious problems. After a time, many pests become resistant to pesticides. Some 504 insects and mites, 270 weed species, and 150 plant pathogens throughout the world are now resistant to pesticides.[3] By killing off beneficial insects, the use of pesticides can also give rise to outbreaks of other insect pests, known as secondary pests.

" Pesticides are among the few toxic materials deliberately added to the environment."

Dr. Marion Moses
Pesticide Education Center

How do pesticides affect the environment?

Pesticides can damage nontarget organisms such as wildlife, birds, and honeybees. In addition, they can harm microorganisms in the soil essential to soil health. Fish kills result from pesticide spills and drift and from pesticides being washed into streams and lakes from adjoining treated agricultural lands. Birds can be harmed by exposure to pesticides on croplands. They also ingest granular pesticides or eat worms from treated turf in urban or suburban areas and die. Long-term exposure can result in lowered survival rates or decreased reproduction.[4]

Because their use is so widespread, pesticides affect the quality of our air, soil, and water. Pesticides have been detected in rain and fog. A US Geological Survey study published in 1991 found traces of herbicides in rainwater samples from a 23-state area mainly in the Midwest and Northeast.[5]

Seventy-four different pesticides have been detected in drinking water wells of 38 states.[6] EPA's National Pesticide Survey, conducted from 1988 to 1990, found that 10.4% of the nation's community drinking water wells and 4.2% of private rural wells had detectable residues of at least one pesticide.[7]

What kinds of pesticides are generally used around the home and community?

Most pesticides used in our homes and gardens are **disinfectants** and the **insecticides** and **herbicides** made from synthetic organic compounds. These chemical compounds include organochlorines, organophosphates, and carbamates. Pesticides made from pyrethrins (botanical

insecticides derived from plants) and pyrethroids (synthetic pesticides modeled on pyrethrins) are also used. **Rodenticides** and **fungicides** are used but to a lesser extent.

By 1988 many uses of organochlorines such as DDT, chlordane, and heptachlor were cancelled or severely restricted because they were found to persist in the environment, magnify in the food chain, and remain in the body. For example, residues of chlordane and heptachlor, once widely used to kill termites, have been detected in indoor air 20 years after application. Today, the most commonly used pesticides in the home and garden are: the organophosphates such as chlorpyrifos (Dursban®) and dichlorvos, also known as DDVP, (Vapona®); and the carbamates, such as carbaryl (Sevin®) and propoxur (Baygon®).

What are the health effects of these pesticides?

Organophosphates affect the nervous system. They inhibit cholinesterase, a key enzyme in the nerves, brain, and blood. Although less persistent environmentally than the organochlorines, they are generally more toxic to humans upon direct contact and have caused more deaths from acute poisoning than any other insecticide group. They also can have long-term effects. Some organophosphates are potential carcinogens; some can cause reproductive problems and birth defects.

Organochlorine pesticides such as lindane are known to be present in human breast milk and are transferred to the nursing infant.[8] Furthermore, a study published in 1992 found elevated pesticide residues in breast tissues of women with malignant breast disease.[9]

Although the carbamates act on the nervous system, the effects are generally of shorter duration than the effects from organophosphate poisonings. Pyrethrins and pyrethroids also affect the nervous system and may cause allergic reactions in humans.

Almost nothing is known about the effects of exposure to a number of pesticides in combination or exposure to pesticides combined with other substances such as prescription drugs. However, we do know that the simultaneous action of different substances in combination can have a greater total effect than the sum of their individual effects. This phenomenon is known as synergism.

What precautions should be taken to reduce the dangers of exposure?

If pesticides are used, great care must be taken to avoid ingestion, inhalation, or dermal contact. The most important precaution is to read the label carefully each time the pesticide is used. It will give instructions for the use and disposal of the specific pesticide chosen. Protective clothing is usually advised. Other precautions include avoiding putting the hands near the mouth or eyes while working

Credit: National Agricultural Chemicals Association

with pesticides and washing thoroughly after use. Never remove pesticides from their original container; never place them in unmarked containers. Keep them in a safe, preferably locked, area. Do not reuse old containers.

Careful disposal is equally important. Pesticides disposed of in the trash or down the drain can end up in ground or surface water which may be sources of drinking water. If burned, they release very toxic fumes and may even explode. The best way to dispose of pesticides is to take them to a household hazardous waste collection facility or event. If such a facility does not exist in your community, keep them in a safe place until a sound disposal option becomes available.

If a pesticide is on the market, isn't it safe?

The federal government does not guarantee the safety of pesticides. The registration of a pesticide by EPA assures only that it poses no "unreasonable risk" if used as directed. Thousands of pesticides have been marketed without the required laboratory testing. Full formulations are supposed to have the acute toxicity tests, but many now on the market are missing these tests. Only 13 of the approximately 600 active ingredients used in pesticide formulations had been completely tested by early 1992 although federal law now requires the manufacturers to complete all tests by 1997.[10]

The use of any pesticide poses some hazard. Data on home use pesticides are insufficient. In 1987 the Consumers Union compiled a list of 50 active ingredients of pesticides used around the home and found that 66% had been inadequately tested to determine whether they could cause cancer, 72% inadequately tested for mutations, 62% for

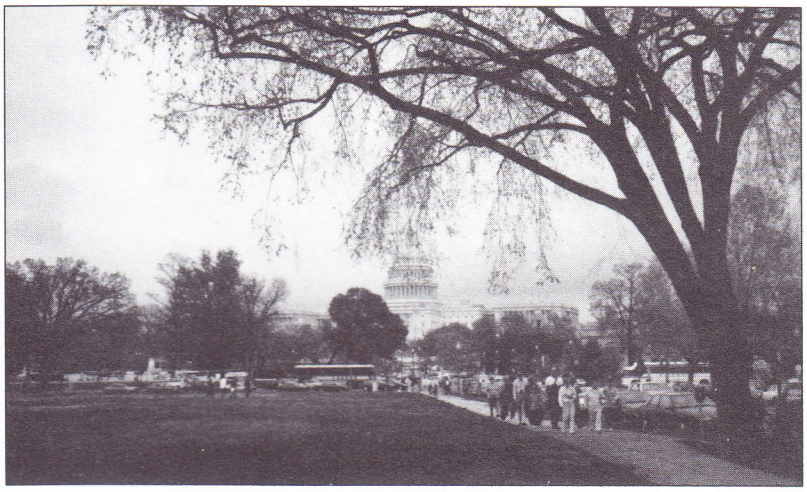
birth defects, 64% for adverse effects on reproduction, and 98% for neurobehavioral effects.[11]

If pesticides are not used in the home, what is the health risk?

There are several reasons for concern. One is that every individual is subject to accidental exposure from the widespread use of these poisons by others. Another is that many household products contain pesticides. A third area of concern is pesticide residues on food. Many food items sold in supermarkets in the US contain residues of one or more pesticides. Because almost all pesticides lack complete health data and so little is known about the effects of exposure to several pesticides in combination, serious questions remain. (See Pesticide Residues on Food.) Finally, there is concern about exposure to pesticide residues in drinking water, particularly in agricultural areas.

COMMONLY USED HOUSEHOLD PESTICIDES

CHEMICAL NAME	SOME COMMON TRADE NAMES	COMMON USAGE
CHLORPYRIFOS	Dursban, Raid Roach Bait, Raid Liquid Roach & Ant Killer, Hot Shot Roach & Ant Killer Real Kill Ant & Roach Killer	For household insect control. Widely used as termiticide. Used outdoors primarily in granular form for control of turf insects, ticks, chiggers, and ants. Also in flea collars, shampoos, and sprays.
DIAZINON	Spectracide	For fleas, ants, and roaches. In granular form for control of turf and garden soil insects.
DICHLORVOS (DDVP)	Vapona	Primarily used in "no-pest strips" to kill flying insects.
CARBARYL	Sevin, Ortho Bug-Geta Plus	For household pests in flea dusts and flea collars (especially those sold in pet stores and by veterinarians). The most commonly used insecticide for broad-spectrum chewing insect control on fruit, vegetables, flowers, trees, shrubs and lawns. Usually applied to leaf surfaces in wettable powder and dust forms.
PROPOXUR	Baygon, Raid Professional Strength Ant & Roach Killer, Raid Wasp & Hornet Killer	For cockroaches, flies, mosquitoes, fleas, and ticks. Used in granular applications for turf insect control.
PYRETHRINS	Raid House & Garden, Raid Liquid Roach & Ant Killer, Hartz 2 in 1 Household Flea & Tick Killer	Used in aerosol form for household insect control.
SYNTHETIC PYRETHROIDS [1]d-trans ALLETHRIN [2]CYLATHRIN [3]PERMETHRIN	[1]Hot Shot Flea & Tick Killer, Hot Shot Roach & Ant Killer, Black Flag Dry Flying Insect Killer, Combat Ant & Roach Killer, Raid Yard Guard [2]Raid Max-Fogger, Raid Max Roach & Ant Killer [3]Raid Fumigator, Raid Yard Guard	Used in aerosol form for household control of insects.
DIETHYLTOLUAMIDE (DEET)	Cutter Tick Repellent, Cutter Insect Repellent, Off Insect Repellent, Hartz Blockade Dog Flea & Tick Repellent	Used to repel insects and ticks.
2,4-D	Weed-B-Gon, Dragon Poison Ivy, Poison Oak Killer, Formula 40, Trimec weed & feed formulations	A commonly used lawn herbicide for control of dandelions and broadleaf weeds. Usually applied in granular form in lawn fertilizers.
GLYPHOSATE	Roundup, Kleenup	Lawn and garden weed control.
CAPTAN	Orthocide, Dragon Captan Wettable	For control of diseases on trees, shrubs, roses, flowers, fruits, and vegetables. Generally applied as wettable powder to plant surfaces.
PARADICHLOROBENZENE	Paracide, Reefer-Galler Snowhite Moth Crystals, Reefer-Galler SLA Spray	Used as a moth repellent, air freshener, and deodorizer in homes and public facilities.
BRODIFACOUM	d-Con Rat Killer, Talon	Used to control rats and mice.



Credit: Susan Boyd

In the Nation's Capital, Integrated Pest Management is practiced widely— in schools, government buildings and on National Park property.

What are alternative ways of dealing with pests?

The best approach is to prevent pest problems in the first place. Clean up the sources of food and water that attract them, remove debris that might provide shelter, and use physical controls such as screens and caulking. If pests are present, they can be controlled by using nonchemical methods such as traps or insecticidal dusts such as natural diatomaceous earth, or by using biological controls that expose pests to natural enemies or disease microorganisms. A system using combinations of such approaches is called Integrated Pest Management, or IPM.

How does IPM work?

Rather than relying on scheduled spraying which can actually exacerbate the problem, IPM uses a knowledge of a pest's life cycle and habits to control it, while minimizing hazards to health and the environment. IPM is generally described as a five step process: **inspection** to gather information about the type of pest; **monitoring** to determine how serious the problem is; **establishment of a threshold level** above which the number of pests is intolerable; **treatment** using the least-toxic methods possible; and **evaluation** of the success of the IPM process.

It should be noted that the term IPM means different things to different people. The concept was developed in the 1920s as a cost-effective means of protecting crops from insect pests. The use of pesticides was greatly reduced because chemicals were applied only when a certain "threshold" level of pest infestation was surpassed.

Today, the definitions of IPM vary widely. Environmentalists and others may define it as a system which uses no chemicals at all. Some may use the term in the original sense. Pest control companies, on the other hand, may use the term loosely to justify their normal applications of chemicals. When contracting with a pest control firm that advertises IPM services, it is important to ensure that all of the outlined steps are followed. Many such companies stretch the definition of IPM to include routine spraying. Some neither inspect, monitor, nor evaluate.

In this guide, the term IPM is used to describe a system that assures that all alternative treatments will be evaluated once monitoring has determined that a serious pest problem exists and that, if the use of a pesticide is deemed absolutely necessary, the one that is least toxic and most selective will be used.

Can communities and individuals save money by reducing their use of pesticides?

As pests become resistant, more and more pesticides are required to achieve control, and costs escalate. Programs addressing the causes of pest problems rather than just treating the symptoms will succeed in the end. Long-term solutions using IPM strategies, while labor intensive, save money over the long run.

However, the financial benefit should not be the primary consideration. In making a decision whether or not to use a pesticide, the responsible citizen must weigh all of the factors involved: health and environmental impacts, social and economic considerations, and the life cycle of the pesticide from formulation to disposal. The decision to use a pesticide in effect condones the continued exposure to and potential harm from these poisonous materials.

Pesticides and Health

Pesticides can affect every living organism. Human beings are no exception. Pesticides vary in toxicity and persistence. Their potential for causing health effects depends on these factors and on the extent and type of exposure. Moreover, some evidence suggests that prescription drugs can exacerbate the effects of pesticides.[12]

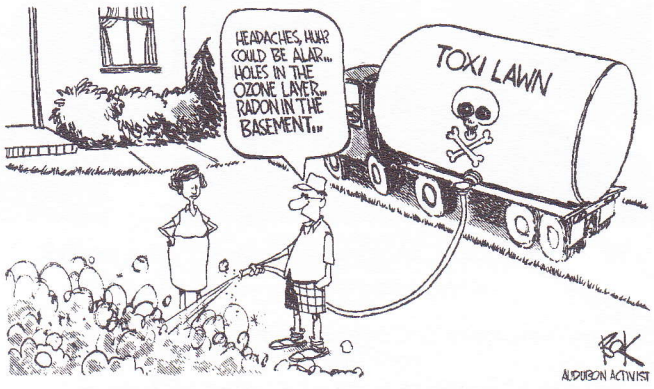
Individuals vary widely in their susceptibility. A chemically sensitive individual can be severely affected by even a slight exposure. Others may suffer unknowingly and gradually from continuing low-level exposure. Little is known about these long-term effects.

Pesticides enter the body through inhalation, ingestion, or contact with the skin. They can be absorbed faster when inhaled. As a result, airborne pesticides are especially threatening. These can be inhaled not only during application but also much later when residues from slowly degrading pesticides such as lindane, DDVP, and chlordane reenter the air. They can also be inhaled when mixed with dust.[13]

Acute and Chronic Effects

Symptoms of **acute** poisoning depend on the pesticide to which a person is exposed but may include headache, blurred vision, nausea and vomiting, pulmonary edema, changes in heart rate, muscle weakness, respiratory paralysis, mental confusion, convulsions, and coma. Exposures to insecticides such as propoxur and diazinon, for example, can cause brain damage, vision impairment, and behavioral disorders.[14]

The **chronic**, or long-term, effects of pesticides include cancer, birth defects, alteration of DNA, nervous system disorders, liver and kidney damage, respiratory problems, and problems of reproduction. The most frequently used pesticides include several with potentially serious chronic health effects. For example, propoxur, which is widely used indoors for insect control, is classified as a probable human carcinogen as well as a neurotoxin. National Cancer Institute studies have linked the herbicide 2,4-D, an ingredient in more than 1,500 pesticide formulations, to cancer in farmers as well as malignant lymphoma in dogs.[15] Adverse health effects linked to diazinon, also commonly used by consumers and lawn care companies, include kidney, liver, and nerve damage. Recently scientists have found evidence that certain pesticides such as organochlorines and synthetic pyrethroids may act to disrupt the hormonal systems of animals. These pesticides appear to mimic natural sex hormones resulting in malformed sexual organs, birth defects, changes in sex-linked behavior, decreased fertility, and immune system suppression.[16]



Credit: Chip Bok

Vulnerability of Children and the Elderly

Children are particularly vulnerable to the effects of pesticides. Because their bodies are smaller, they receive proportionally higher doses of toxins per body weight than do adults. Children's organs can be damaged more readily because they are not fully developed. Since children's cells divide more rapidly than those of adults, exposure to carcinogens is of special concern. Many of the most frequently used pesticides affect the nervous system, and children have been found to be more susceptible to neurotoxins than adults. Relative to their weight, children eat more food and drink more water and fruit juice, and thus ingest more pesticide residues, than do adults.[17] The National Cancer Institute found an increased risk of leukemia in children whose parents used pesticides in the home or garden.[18]

The elderly also can be at greater risk from pesticide exposure. They are more susceptible because their immune systems and organ functions decline with age. The liver and kidney are particularly vulnerable. The elderly are also more apt to use prescription drugs which can increase sensitivity to pesticide poisoning. Despite the growing numbers of older Americans, almost no research exists on the effects of pesticide exposure on the elderly.[19]

Indoor Exposure

Most Americans spend roughly 90% of their time indoors, thus the impact of pesticide use inside buildings is potentially serious. Not only do individuals apply pesticides themselves, but over 40,000 commercial pest control firms treat homes, schools, day care centers, workplaces, hospitals, and other buildings.[20] In addition, pesticides are often found in such products as treated lumber, paint, detergents, carpeting, furniture, shower curtains, and shelf paper.

Indoor pesticide exposure occurs in several ways: through the direct application of pesticides; by the slow release of pesticides contained in household products such as flea collars, hanging strips, and mothballs; through residues on food and in drinking water; as a result of drift of pesticides used outdoors; and from pesticides applied many years before. Pesticides used indoors are not subject to the normal decomposition processes of light, wind, and precipitation. Additionally, some pesticides vaporize slowly over many years. Thus occupants of a building can be exposed to pesticides they never knew had been applied.

In Homes

Pesticides are used in 75 million households nationwide.[21] A typical household pesticide inventory includes: insecticides and rodenticides used to control house pests; insecticides applied to pets; pesticides used to control insects and diseases on indoor plants; disinfectants to combat mold and germs and for water and sewage treatment; as well as those termiticides, fungicides, and insecticides present in treated wood, paint, carpets, and some shelf paper.

While occupational exposure to pesticides by farm workers and pest control operators has been studied, albeit minimally, little was known about household exposure until 1990 when EPA released its Nonoccupational Pesticide Exposure Study (NOPES). Researchers collected air samples from selected homes and analyzed them for 32 of the most commonly used household pesticides. The five most prevalent pesticides (chlorpyrifos, propoxur, ortho-Phenylphenol, chlordane, and diazinon) were, in most cases, found at indoor concentrations 5-100 times higher than outdoor levels. NOPES indicated that household dust may be a source of exposure through dermal contact, ingestion, and inhalation especially for infants and toddlers. Additionally, the study suggested that dust may be a "significant reservoir" for older, more persistent pesticides such as chlordane.[22] In a related study in 1991, EPA found 23 household pesticides present in indoor air. Not only were recently applied pesticides detected, but residues of older, more persistent pesticides also were found.[23]

Since young children crawl on floors and put things in their mouths, they often come into direct contact with pesticide residues. Another 1990 study of indoor residential pesticide applications found substantially higher concentrations of pesticides in the infant breathing zone, which is close to the floor.[24]

"It really is up to the public to be aware of the dangers of chemicals and to not naively trust the exterminator and the government to ensure their safety."

Christine Carpenter
chlordane victim

Health Effects of Common Household Pesticides

Among the five pesticides detected most frequently in indoor air, several have potentially serious health effects. **Propoxur** is classified as a probable human carcinogen as well as a neurotoxin.[25] **Chlorpyrifos** has been linked to numerous cases of poisoning.[26] While some poisonings are the result of improper or illegal applications, many others result from normal usage. EPA acknowledges that chlorpyrifos has not been adequately tested for carcinogenicity, mutagenicity, or neurotoxicity.[27] Adverse health effects linked to **diazinon** include kidney and liver damage and neurotoxicity. Although **chlordane** has been banned for termite control since 1988, it is still one of the most commonly detected pesticides indoors. Acute exposure to chlordane damages the central nervous system. Chlordane has also been linked to cancer in humans. In the 30 years prior to 1988, chlordane comprised 80% of the termiticide market and was used in nearly 25 million homes and buildings.[28]

Disinfectants

Disinfectants are pesticides designed to kill bacteria, fungi, and viruses and therefore include many ingredients that are toxic to humans and to the environment. They represent the largest category of pesticides used indoors. For example, one of the five compounds most frequently found in indoor air by the NOPES study was ortho-Phenylphenol, an active ingredient in many popular disinfectants.

At home, disinfectants are used by many simply to clean rather than to kill germs in which case alternatives that are nontoxic are preferable. In cases where infectious disease is present, at home or in a medical facility, or where germs are killed to prevent disease, there is an obvious need for effective disinfectants. However, as many as 20% of the disinfectants on the market may be ineffective according to a 1990 General Accounting Office (GAO) report. This study found that even though EPA requires manufacturers to submit efficacy data for their products, it does not test them independently and lacks criteria to assess the validity of the methods used to test them.

One chemical, formaldehyde, is used in many commercial products for its disinfectant properties and can cause and/or contribute to serious health problems resulting from inhalation of its vapors. The American Lung Association considers formaldehyde a major indoor health pollutant. It can cause irritation to the eyes and respiratory tract, asthma, and/or dermatitis. Formaldehyde may also be a central nervous system depressant. As of early 1992, it was classified as a possible human carcinogen.

Repeated or long-term exposure to formaldehyde appears to increase chemical sensitivity. Standards of exposure have been set for formaldehyde in the workplace by the US Occupational Safety and Health Administration (OSHA) but not for the home. This is of particular concern as formaldehyde is contained in a wide range of other materials found in homes as well — in building materials, insulation, paneling, particleboard materials, furniture, draperies, carpets, upholstery, clothing, and even paper products and cosmetics.

What you can do

- For cleaning, choose alternatives that are nontoxic.
- Before purchasing products such as those cited, ask whether they contain formaldehyde.
- Increase ventilation.
- If you suspect a formaldehyde problem, you may want to consider contacting a local laboratory to have the air tested.
- Reduce formaldehyde vapors by sealing building materials with paints or varnishes.
- Dehumidify the air, since humidity causes formaldehyde levels to rise.

Sources: U.S. Environmental Protection Agency, *Nonoccupational Pesticide Exposure Study (NOPES)*, January 1990. U.S. General Accounting Office, *Disinfectants: EPA Lacks Assurance They Work*, GAO/RCED-90-139, August 1990. "Formaldehyde," Indoor Air Pollution Fact Sheet, Boston, MA: American Lung Association, August 1986. "Facts on Formaldehyde," New Jersey Department of Health Fact Sheet, March 1987.

Credit: Maggie Knaus

Despite the fact that most people do not take precautions when using pesticides, protective clothing should be worn.

Once applied, chlordane persists for decades; there is no effective method of decontamination.

Insecticidal sprays and foggers used indoors to control ants and fleas pose a special hazard. After application, residues remain which may be inhaled or absorbed through the skin from carpets, upholstery, and other surfaces. Very young children may be at risk of acute illness from such residues. Also, injuries and fires have occurred from exploding cans.

Careless Use, Storage, and Disposal

Most people generally use the appropriate pesticide for their particular pest problem. However, many often fail to read label directions for mixing and applying the pesticide before use. Furthermore, safety precautions are not always taken. Few people wear gloves or protective goggles and clothing, change clothes, or wash their hands after each application.

Often, household pesticides are improperly or hazardously stored. Inventories can be large and comprised of old or seldom used products. For example, in the NOPES study, DDT containers were found in several homes although DDT has been banned for almost 20 years. Finally, many people are unaware of proper disposal methods or community household hazardous waste collection programs.

What You Can Do

Good housekeeping can keep pests out of your home. It is important to modify the environment so they will no longer be attracted to it.

- Cover food and garbage; clean around stoves and refrigerators; keep storage areas dry and well ventilated.
- Repair leaky plumbing; keep area around sinks dry.
- Screen doors and windows; caulk cracks and crevices in walls and foundations.
- Remove pest breeding sites such as pet manure and litter.

When pesticide use is necessary:

- Select the least-toxic methods of pest control. Avoid all **routine** applications of pesticides.
- Read the label carefully. (Some additional information about the pesticide can be obtained from the manufacturer; ask for a Material Safety Data Sheet.)
- Select pesticides carefully; buy only the amount you will use right away; keep pesticides in their original containers; and dispose of empty containers as instructed on label. (Note that disposal instructions are sometimes inadequate.) Find out if there is provision for special disposal in your state or community.
- Use proper precautions. Wear protective clothing.
- Avoid aerosol sprays and foggers.
- If a room is treated, leave the area for as long as recommended by the applicator or label. Upon returning, open windows and air out the room. Clean all surfaces that were possibly contaminated.
- Screen commercial pesticide applicators carefully. Make certain they are licensed, have sufficient liability insurance, and can give you information about the pesticide to be applied, its active ingredient, manufacturer, and target pest. Most importantly, ask them to recommend nonchemical controls. If this is not possible, ask them to choose the least-toxic method of pest control. Beware of recommendations for routine treatments.

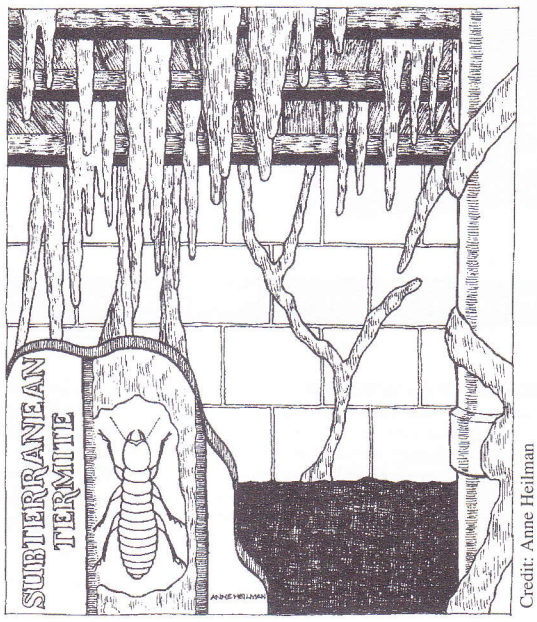
PEST CONTROL GUIDELINES: NONTOXIC OR LEAST-TOXIC METHODS TO CONTROL PESTS

PESTS	PREVENTION	BAITS
ANTS	•Fill cracks around shelves, cupboards, sinks and bathtubs with silicone caulking, putty or paint.•Store food in containers with tight lids.•Wash countertops, cabinets and floor with equal parts vinegar and water.•Rinse all food and beverage containers before placing in recycling bin.•Locate the place of entry. Squeeze a lemon onto it and leave the peel.•Ants will retreat from lines of talcum powder, chalk, bone meal, charcoal dust, cayenne pepper, red chili pepper, paprika, salt, or baking soda.•Ants will not cross lines of sticky ant repellents. These repellents are commercially available but can be very messy. Use caution.	•Mix 2TBS of boric acid with 1TBS powdered sugar. Spread only in enclosed areas such as under the lowest drawer in the counter and under the refrigerator. Wear a mask and gloves when handling boric acid powder. (Boric acid is toxic. Do not apply in areas where food is stored or eaten or around pets and children.)•Mix 1/2 cup baking soda with 1TBS powdered sugar. Spread in corners and along floor boards.
CLOTHES MOTHS	•Vacuum up organic debris in cracks in floor where moths might breed.•Store clothing in a clean condition.•Store clothes in a tight container such as a wooden cedar chest, or wrap clean clothes in heavy brown paper and seal with tape.•Hang cedar chips or balls in the closet or store clothes in a cedar chest.	
COCK-ROACHES	•Clean kitchen and other living space thoroughly and often.•Wash all surfaces and then wipe dry.•Use a vacuum to pick up food crumbs. In the process you will also sweep up roaches and roach eggs. Discard vacuum bag promptly in a tightly sealed container.•Caulk, cement or screen small cracks or gaps along baseboards, walls, cupboards, and around pipes, sinks, bathtub fixtures, and electric lines.•Remove all sources of food and water. Seal food tightly. Rinse all items to be recycled before storage. Don't let water sit in the bottom of plant containers. Repair dripping faucets. Empty drip pan under refrigerator.	•Sprinkle boric acid powder in enclosed areas such as behind appliances and under the sink. Wear a mask and gloves when handling. (Boric acid is toxic. Do not apply in areas where food is stored or eaten or around pets and children.)
FLIES	•Keep garbage receptacles tightly closed.•Sprinkle borax into the bottom of garbage receptacles after they've been washed and allowed to dry.•Flies like sunny windows so close windows before the sun hits them.•Put screens on your windows.•Use a fly swatter.•Dispose of pet feces quickly.	•Make your own fly paper by boiling sugar, corn syrup, and water together. Place mixture onto brown paper and hang or set out. Many commercial, nontoxic fly papers are also available.
SLUGS & SNAILS	•Encourage natural predators. Garter snakes, grass snakes, ground beetles, box turtles, salamanders, ducks, and larvae of lightening bugs all feed on snails.•Protect young plants by encircling them with a tin can with both ends removed. Push bottom end of can into the soil.•Copper backed paper is sold in garden stores. Staple paper to boards that encircle the flower bed.	•Set out saucers or jars of stale beer below ground level near the garden. The fermented liquid attracts snails and slugs, and they drown.•Snails are attracted to potatoes and will attach themselves to the insides. Scoop out the inside of the potato to form a hollow. Place around yard.•Place overturned clay flower pots near the shady side of a plant. Rest one edge on a twig or make sure that the ground is irregular enough for the slugs and snails to crawl under the rim. They will collect there during the brightest part of the day. Remove slugs and snails regularly and drop in a bucket of soapy water.
TICKS	•To discourage ticks, wear clothes that cover all exposed skin.•Stuff pant legs into socks so that the tick will not be able to get close to your skin.•Wear light colors so that you can see the tick quickly.•Examine yourself and your pet closely after walking outdoors. The deer tick, which carries Lyme disease, is no larger than the top of a pin head.	

Sources: William and Helga Olkowski and Sheila Daar, *Common-Sense Pest Control*, Newtown, CT: The Taunton Press, 1991. Debra Dadd, *The Nontoxic Home: Protecting Yourself and Your Family from Everyday Toxics and Health Hazards*, Los Angeles: Jeremy P. Tarcher, Inc., 1986.

Termites

Termites present a special pest problem in commercial establishments and other public buildings as well as in homes because of the costly and serious property damage they can cause. They are found throughout the United States with heaviest infestations occurring in the Southeast and in the Southwest. The two most common varieties of termites are subterranean and drywood. Subterranean termites, the most prevalent of the two types, live in the ground and build mud tubes inside walls to reach wooden window frames, cabinets, and shelving. Any building is a target, even one with masonry walls and concrete foundations. Drywood termites, on the other hand, live entirely indoors, usually in the beams of the attic or garage. These termites can consume entire boards, leaving only a thin outer shell.



Credit: Anne Heilman

Prevention

You can protect your home by reducing damp areas: keep crawlspaces well ventilated; repair leaky pipes; and provide good drainage around the foundation. There should be no direct wood-to-soil contact. Appropriate use of metal guards can help reduce termite problems. Wood supports for patios should be on concrete blocks; firewood should not be stacked against the house; and old stumps and logs should be removed from the yard. For new construction, use poured concrete foundations or masonry unit foundations capped with reinforced concrete. Repair any cracks in the foundation immediately.

If you suspect termites, find out, if possible, when your home was last treated. It may need only spot treatments in which case fiber optics technology or trained dogs can be used to locate termite colonies. Always get estimates from more than one pest control company.

Chemical Treatment

Chemical treatment of subterranean termites usually involves digging a trench or drilling holes through the foundation and injecting insecticides into the soil to prevent termites from entering the building. The building does not have to be vacated during treatment. Treatment of heavy infestations of drywood termites generally requires tenting and fumigation of the building. People, pets, and plants must be evacuated for at least 48 hours to as long as seven days.

In the past, termites were controlled through the application of chlordane and heptachlor. Extremely toxic chemicals, they contaminate the soil for years. In the 1970s and 1980s, reports of home contaminations and serious health problems resulted in pressure on EPA to ban them. In 1988 their sole manufacturer agreed voluntarily to halt domestic sales.

One of the most widely used chemical alternatives to chlordane and heptachlor is chlorpyrifos (Dursban®). Although it is less likely than chlordane to leave long-lasting toxic residues in buildings or the environment, it is still a potent neurotoxin which has been linked to numerous incidents of poisoning throughout the country. More recently the synthetic pyrethroids such as resmethrin have been used as alternatives to chlordane. Although the pyrethroids are less toxic and degrade more rapidly than chlordane or chlorpyrifos, they can still harm the environment and cause severe allergic reactions in some people.

Least-toxic controls include borax, desiccating dusts such as diatomaceous earth, and a growth regulator called methoprene, an insect juvenile hormone that prevents young termites from reaching the reproductive stage.

Nonchemical Treatment

Successful nontoxic termite control methods include the use of nematodes, cold and heat treatments, and the use of sand-blasting sand around the base of the structure. Nematodes, microscopic worms which feed on certain insects, have been proven effective against termites in laboratory testing. While their effectiveness has not been widely assessed in houses, experimental use by some pest control companies has proved quite successful. For drywood termites, options include a liquid nitrogen treatment that involves injecting ultra-cold nitrogen gas into the wood to freeze termites and an electro-gun treatment that kills using low-voltage current. Recently, a process that kills drywood termites by raising indoor temperature to 150° F has been developed. With additional research, these alternative techniques will become less expensive and more widely available. In addition, oil extracts from the neem tree have proven directly toxic to termites.

Sources: "Killing Termites with Temperature," *EcoSource, Inc.*, January-February 1991. James Scott and Nancy Watzman, *Contaminated Classrooms: An Investigation of Pest Control Practices in Texas Schools*, Washington, DC: Public Citizen, January 1991. William and Helga Olkowski and Sheila Daar, *Common-Sense Pest Control*, Newtown, CT: The Taunton Press, 1991.

In Public Buildings

Most Americans spend a substantial portion of their time in public and commercial buildings — whether living in apartment buildings, condominiums, or public housing, working in offices and factories, dining in restaurants, shopping in retail and grocery stores, or using hospitals, day care centers, and nursing homes. Large numbers of people are exposed to pesticides in these buildings without their knowledge or consent. This is a particular problem in the case of hospitals and nursing homes where many occupants have heightened sensitivity to the toxic effects of pesticides. Pesticide use in buildings can be particularly hazardous when there is poor ventilation or recirculated air.

Routine Chemical Treatment

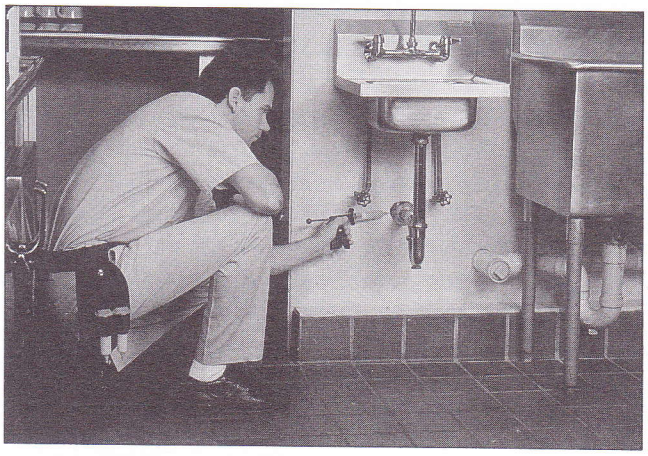
Traditionally, pest control in public buildings has relied on the routine application of chemical pesticides. This is usually done by in-house staff or by a commercial pest control company. In either case, pest management activities are often not coordinated with other activities such as sanitation and building maintenance. Overall pesticide concentrations are increased when individual occupants of buildings apply additional pesticides within their own offices and apartments.

Routine applications of pesticides can result in pests developing resistance to the chemicals. For example, pest control applicators at the Boston Housing Authority report that roaches have developed a genetic resistance to Dursban® and the synthetic pyrethrin Demon®.[29] In these cases, applicators frequently either change to more toxic products or increase the amount of pesticide used to control the same pest population.

Alternative Treatment

IPM can reduce health risks and, ultimately, reduce costs. To be effective, IPM must integrate and coordinate all components of building management — maintenance, sanitation, waste management, and pest control — and incorporate changes in management, training, and education.

Recent examples of successful IPM programs include Peabody Terrace, a 500-unit apartment complex in Cambridge, Massachusetts; the Metropolitan Toronto Housing Authority, a 30,000-unit project in Canada; and a 313-unit public housing complex in Chapel Hill, North Carolina. In all cases, the programs rely on prevention and the use of least-toxic pest control methods. Results indicate wide acceptance by residents and costs below those of conventional pesticide-dependent programs.



Credit: Specialty Products a division of EFD

An applicator uses a BaitGun™ to apply a least-toxic paste bait.

IPM in Federal Buildings: Washington, DC

The National Capital Region (NCR) of the General Services Administration (GSA) has implemented IPM in federal buildings. In 1988 NCR promoted procedures to reduce pests in waste disposal, custodial services, food service, landscaping, and all aspects of building maintenance including structural maintenance.

The IPM program was developed by GSA's regional entomologist who is responsible for administering the pest control program for over 100 federal buildings in Washington, DC, Maryland, and Virginia. IPM will soon be expanded to include over 7,000 federal government buildings around the nation.

The government's IPM contractors have closely monitored the use of toxic chemicals in all NCR buildings, totalling about 20 million square feet of indoor space. In 1989 the contractors were able to reduce the total use of pesticides in these buildings by over 90% from pre-IPM levels. Most pesticides now applied are either containerized traps or paste baits. No pesticides may be applied to exposed surfaces in these buildings. This program has gained national recognition for being practical and effective with applicability in private and commercial buildings as well.

For more information, contact Dr. Albert Greene, Regional Entomologist and National IPM Coordinator, General Services Administration, National Capital Region, WPMOB, Washington, DC 20407 (202) 708-6948.

What You Can Do

- Become involved in building management pest control policy.
- Ask management to hire pesticide applicators trained in IPM methods. Educate building occupants and encourage them to participate in the program.
- Before contracts are awarded, request information on least-toxic methods and evidence of good safety records. Insist that the contract not include routine service.
- Request the installation of modern equipment such as self-contained trash compactors, new baits and traps, and compact, portable cleaning units.
- For assistance in claiming multiple chemical sensitivity as a disability to avoid the spraying of your housing unit, you may contact the Office of the General Counsel, Fair Housing Division, Room 9238 at the Department of Housing and Urban Development, 451 7th Street SW, Washington, DC 20410-0500 (202) 708-0340.

In Schools

Schools are particularly vulnerable to pest problems because they typically contain trouble spots such as food preparation facilities, dining and snack areas, and waste storage facilities. Additionally, school buildings, like all other buildings, can attract termites and other structural pests. Stinging insects and weeds such as poison ivy can hamper playground and sports activities. Head lice are a special problem.

Many school maintenance personnel treat indoor and outdoor pests on a scheduled basis, irrespective of need. Among the pesticides commonly used by schools are diazinon (Spectracide®), chlorpyrifos (Dursban®), and propoxur (Baygon®).[30]

Misuse of Pesticides

The problem of the routine use of pesticides in schools is compounded by improper handling and application. Pesticides are frequently applied by school personnel such as janitors and grounds supervisors who might not be trained as applicators. Proper and improper use of pesticides has caused problems in schools and day care centers around the country. For example, in 1990 in South Carolina 15 district public schools were cited for 20 violations including improper storage of pesticides, storage of the banned pesticides chlordane and lindane, and possession of restricted-use pesticides when the schools lacked a licensed applicator.[31] In a separate case, the grounds supervisor for the Greenville County School District illegally fogged three classrooms with lindane for head lice control. Lindane is a restricted-use pesticide and was banned generally for indoor use in 1983.[32] Although space treatment for lice is common in schools, the Centers for Disease Control recommends against it because it is not effective and may pose health hazards.

Credit: Maggie Knaus

Children can be exposed frequently to pesticides if a school is treated on a scheduled basis for cockroaches or other pests.

In 1990, weekly applications of chlorpyrifos to control cockroaches in the nursery and baby-sitting areas of a local YMCA resulted in complaints by employees of headaches and nausea to the Massachusetts Departments of Labor and Agriculture.[33] Both strongly urged that the YMCA reduce its use of pesticides. The state is also helping to develop an IPM program for the YMCA.

Alternative Treatment

Some school systems are using IPM methods. A new Texas law requires all Texas schools to adopt IPM programs by September 1995.[34]

Until recently, few organizations representing the occupants of schools had become involved in the problem of pesticide use. However, in 1985 the national PTA, and in 1991 the National Education Association, called for closer monitoring of pesticide use and increased use of least-toxic solutions.

IPM in Schools: California, Maryland, and Florida

Chemicals are the primary means of pest control in most schools despite the fact that children are particularly susceptible to these toxic substances. In October 1991 the staff of the San Diego Unified School District, the San Diego Teachers Association, and the Environmental Health Coalition agreed on the nation's first comprehensive IPM policy for a school district. This policy requires the use of least-toxic pest control methods for the management of pests in the district's approximately 180 schools and on their grounds. The adoption of an IPM policy is crucial to ensuring that IPM programs are protected against a return to toxic pest control practices.

Although, as of 1991, an official policy had not yet been agreed upon, the Montgomery County Public School (MCPS) system in Maryland has become the model for approximately 500 public schools throughout the state in adopting IPM principles. Teachers, parents, students, and administrators have expressed satisfaction with the program. Most importantly, schools have fewer pest problems than ever before. The MCPS system was able to reduce its pesticide use by 90% between 1988 and 1990 as well as its costs.

Dade County, Florida, has implemented an IPM program with the goal of eliminating pesticides in all of its public schools. This is significant because Dade County Public School District is the fourth largest school system in the US. It contains 280 schools and more than 302,000 students, 15,000 teachers, and 21,000 support personnel.

For more information, contact Sharon Taylor, Environmental Health Coalition, 1717 Kettner Boulevard, Suite 100, San Diego, CA 92101 (619) 235-0281; William Forbes, MCPS, Pest Management Shop, 16651 Crabsbranch Way, Rockville, MD 20855 (301) 840-8100; and Edmund Benson, ARISE, 4001 Edmund F. Benson Blvd. (NW 9th Avenue), Suite 201, Miami, FL 33178 (305) 592-2767.

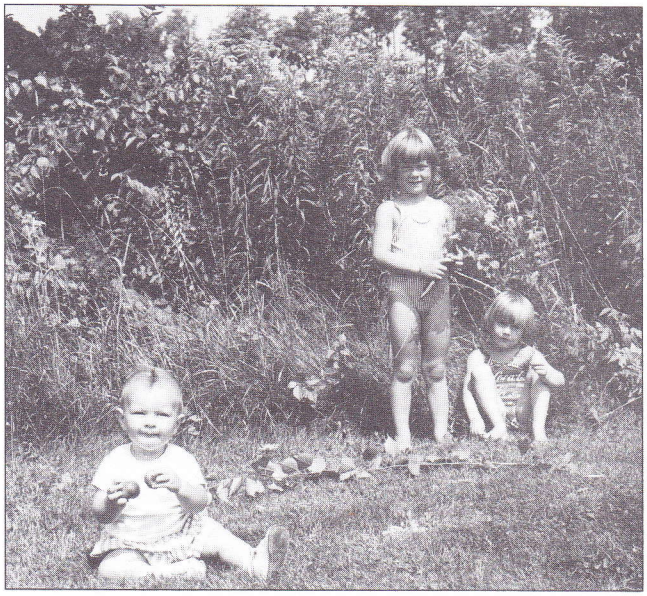
What You Can Do

- Encourage your school and school district to develop IPM policies. Involve the PTA, the teachers' unions, food service personnel, janitors, and others.
- Question the principal, the school board, and the PTA. What pesticides are being used and when? Ask for information about their active and inert ingredients, their health effects and their target pests? Are the applicators trained and licensed? Are the pesticides being applied properly? Is adequate warning given? Does the school system maintain a list of all known chemically sensitive children and notify their parents prior to pesticide application?
- Inform parents and teachers about head lice prevention and control: immediately report infestation to school officials and parents; check for lice and nits (eggs) nightly for 12 days; use a head lice comb and a shampoo or soap with coconut or olive oil base; do not share personal items like clothes, towels, and combs; and never spray your house for head lice.

Lawn and Garden Exposure

The National Academy of Sciences has reported that homeowners in the US use 10 times more pesticides per acre on their lawns and gardens than do farmers on their crops, an estimated 5-10 pounds of pesticides per acre of lawn per year.[35] Moreover, over seven million homeowners employ chemical landscaping, commonly known as "lawn care," services to do routine spraying of their lawns, gardens, and trees.[36]

This indiscriminate use of herbicides on the nation's lawns and gardens may be having an unanticipated effect. In EPA's National Pesticide Survey of private and public drinking water wells, the pesticide most often detected was a breakdown product of dacthal (DCPA), a pesticide used primarily on lawns.



Credit: Maggie Knaus

Nontoxic lawn care is especially important when children use the area for play.

Health Considerations

Some lawn care pesticides are known to cause adverse health effects. In 1989 Public Citizen reviewed the health effects of some of the pesticides used most frequently by the lawn care industry and found that 12 are suspected human carcinogens, 21 can cause other long-term health hazards, and 20 can cause short-term nervous system damage.[37]

Moreover, of the 32 major lawn care pesticides subject to reexamination by EPA, none had been completely reassessed by 1990.[38] Claiming that exposure to lawn care products does not occur on a routine basis over long periods of time, EPA does not usually require testing for chronic effects.[39] However, the fact that long-term exposure may not occur does not mean that long-term health effects may not result.

Children are particularly at risk from lawn and garden care pesticides not only because they generally spend more time out-of-doors and have more contact with grassy areas than do adults but also because of their sensitivity to these chemicals.

Use and Misuse

Many consumers fail to pay attention to pesticide label warnings or safety information. Few homeowners or lawn care employees wear gloves or face masks when applying pesticides to lawns or gardens. Many homeowners use more pesticide than is recommended or in greater concentration. Accidents are not unusual both on the part of consumers and lawn care companies. Even careful use can result in drift into buildings, onto neighboring property and/or vegetable gardens, and into local water supplies resulting in exposure of wildlife, pets, and individuals nearby.

Increase in Citizen Awareness

Between 1987 and 1991, in response to consumer demand, there was a significant increase in the number of lawn care companies using nonchemical methods of pest control. During the same period, sales of organic lawn care products grew from about 2% to 14% of all lawn care product sales. This percentage is expected to increase rapidly in the coming years.[40] (Consumers should read the labels of these products carefully to make sure they are indeed pesticide-free.)

Natural Landscaping

Many citizens interested in reducing their pesticide use are using ground cover, shrubs, wildflowers, and ornamental grasses around their homes instead of the usual grass monoculture which requires constant treatment.

Credit: Lorrie Otto

Ground cover provides an attractive alternative to grass.

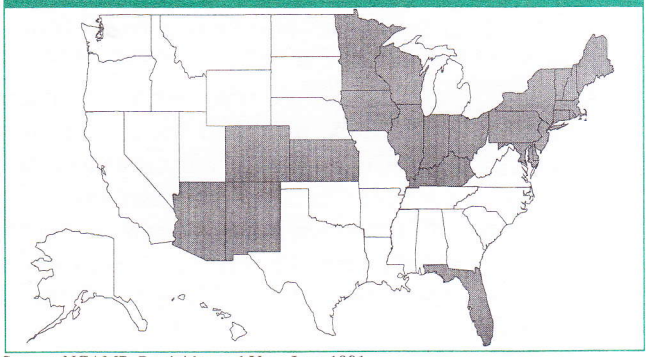
However, since some local ordinances place limits on the height of grasses allowed around homes, those who desire natural landscaping must sometimes work to change local ordinances before they can establish their plant mix.

Notification Ordinances and Laws

A number of local jurisdictions and 23 states have passed regulations requiring that chemical lawn care companies notify customers, and sometimes neighbors, of intent to spray. Some require the posting of warning signs, and some states have required the establishment of a registry of the chemically sensitive who must be notified before spraying can occur.[41] Enforcement of these regulations, however, varies from community to community.

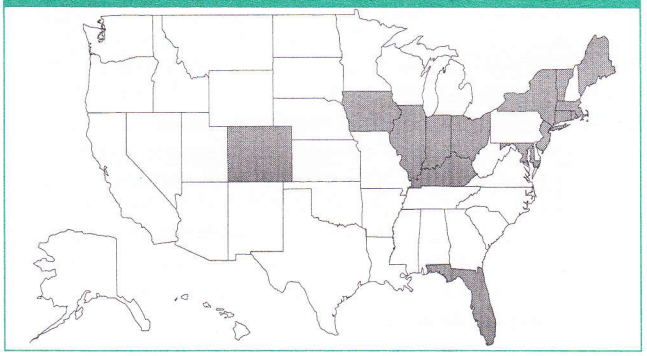
The chemical industry has reacted vigorously to this type of legislation and has brought suit in many areas claiming among other things that local laws are pre-empted by federal law. In 1991 the US Supreme Court ruled that local governments are <u>not</u> pre-empted and can

STATES WITH NOTIFICATION LAWS–1991



Source: NCAMP. Pesticides and You. June 1991

STATES REQUIRING POSTING–1991



legislate, state law permitting, the uses of pesticides in their jurisdictions. This decision has resulted in increased industry pressure on the states and the federal government to include pre-emption in future laws.

Credit: Maggie Knaus

Lawn care companies in Montgomery County, Maryland, are required to post notification signs that chemicals have been applied.

Rose Garden Pesticide Reduction: Eugene, Oregon

The George E. Owen Municipal Rose Garden in Eugene, Oregon, has been using IPM for the last 10 years and no insecticides or fungicides for the last three.

To maintain the health and disease resistance of the garden's roses, several techniques are employed. The gardens are fertilized once a month during the growing season. The roses are pruned on a regular basis to remove small growth that will not support a bloom. Rose varieties prone to rust have been moved from the upwind side of the garden to the downwind side so that the disease will not be carried by the wind and infect healthy plants.

The money and time saved by not using pesticides has meant that more resources can be directed to other activities such as irrigation, fertilization, pruning, and transplanting. Over 400 varieties and more than 4,000 roses have been kept healthy without the need for any insecticide and fungicide sprays.

For more information, contact Tim Rhay, Eugene Parks Services Division, 210 Cheshire Street, Eugene, OR 97401 (503) 687-5334.

Pets

Pets are exposed to pesticides from treated buildings, lawns and shrubs, as well as from those products directly applied, such as flea powders or collars. Adverse health effects can result, especially when pets are exposed to a combination of pesticides. Older, very young, or unhealthy pets may be at the greatest risk because, by law, testing of pesticides used on pets must be done on healthy animals.

Numerous incidents of illness resulting from animals rolling on treated lawns or eating or licking grass have been reported. Many veterinarians do not recognize the symptoms of pesticide poisoning and may, for example, attribute convulsions to epilepsy rather than to pesticide exposure. Other clinical signs of pesticide overexposure include excess salivation, vomiting, lack of coordination, trembling muscles, and/or contracted pupils, all of which may lead to seizures. In 1991 the National Cancer Institute published a study linking frequent lawn care treatments with the herbicide 2,4-D to increased malignant lymphoma in dogs.

Flea powders and household foggers typically contain organophosphates and carbamates which are strong nerve toxins. Pyrethrins and pyrethroids, also found in products used on pets, are somewhat less toxic, but are potentially harmful. In 1987 the manufacturer of a flea and tick product, Blockade®, which contains a pyrethroid, admitted that the product was being blamed for at least 366 animal deaths and 2,700 animal injuries. That year EPA suspended Blockade®, but since then the product has been relabeled and reintroduced to the market. More cautionary instructions and a hang tag are required, but the formula is unchanged.

What You Can Do

Nontoxic approaches

- Minimize pet's exposure to pesticides.
- Groom pets daily with a flea comb.
- Bathe dogs frequently with a soapy solution.
- Avoid flea collars. They are toxic and can irritate the pet's skin.

If you must use a pesticide:

- Wear protective clothing while treating your pet.
- Read the label carefully especially as regards dosage for the size and age of your pet. Although many animal poisonings are due to misuse of the product, normal usage can also be a problem.
- Avoid sprays containing hydrocarbon propellants. These can cause lung damage and are harmful to the atmosphere.
- Use household foggers for flea control only as a last resort.

Sources: National Cancer Institute Press Release, "Dogs Exposed to Herbicide Develop More Lymphomas," September 1991. Hannah Holmes, "Run Spot Run," *Garbage*, July/August 1991. "Hot Time for Companion Animals," *PETA News*, Summer 1991.

What You Can Do at Home

- It *is* possible to garden and grow a lawn without toxic chemical pesticides.
- Plant grass, trees and shrubs indigenous to the area in which you live.
- Control insects by attracting birds and bats to your yard.
- Start a compost pile. Compost in beds can inhibit weed growth as well as enrich and improve the texture of the soil, increase its ability to absorb air and water, and reduce erosion.

GARDEN

Test your soil. It is important to know your soil's pH, or its level of acidity or alkalinity. Check with your county extension service or garden supply store to find out who conducts soil testing in your area or where you can buy a soil test kit.
Increase soil fertility. Add organic matter such as manure or compost to the soil. (If you live near water, use fertilizer sparingly so as not to pollute water sources.)
Learn about plants that repel pests as well as those that attract pests.
Promote populations of beneficial insects. Order "good" insects from mail-order companies after researching your garden needs.
Use bacterial pesticides. They are available for several different kinds of pests.
Mulch. Hand pull weeds.

Spray soap and water on plants and shrubs to fight garden insects. Test a small area of your plants first to ensure no damage will result.
For vegetable gardens:
Rotate crops. Avoid planting the same crop year after year in the same location in the garden.
Diversify plants. Intermingle different types of plants.
Use collars. To prevent cutworms and other insects from burrowing into the soil surrounding your plants, use "collars" made of stiff paper or cardboard. Cut a piece one foot square and wrap around the stem of the plant. Use a paper clip to hold it in place. Press one inch into the soil.
Use netting. Commercially available netting placed over the bed will protect seedlings from chewing insects, keep cats and birds away, and prevent flying insects from laying eggs.

LAWN

Tolerate some weeds on the lawn.
Test your soil. (See above.)
Use organic fertilizers. Base the level and frequency of fertilization and liming on the results of your soil tests. Fertilize three times in the fall. Contact your county extension agent for specific information on lawn care unique to your area.
Select the proper grass seed. Buy one compatible with your soil, area climate conditions, and amount of sun and shade. Irrigate properly. Water deeply but infrequently to encourage root growth. Water in the early morning, not in the evening.
Mow properly. Keep cutting height as high as possible. Mow frequently with sharp blades, in dry weather, and during the cooler parts of the day. Leave cuttings on the lawn. Vary the mowing pattern so that grass does not grow in just one direction.
Minimize thatch. Remove the thatch (the dead grass that lies between the soil and the blades of new grass) by raking in the fall to encourage deep root growth. If few or no pesticides are used, the earthworm population will increase and help recycle the thatch.
Reduce soil compaction. Aerate your lawn in the early fall. Aeration creates holes that will allow water and air to penetrate the turf.
Reseed your lawn in the spring and the fall.

CHOOSING A LAWN CARE SERVICE

What is the company's reputation? Ask for references from the company and for a report from the Better Business Bureau.
How much and what type of training have the applicators received? Do they and the company meet any special state licensing requirements?
Are they able to fully answer all of your questions? Are they able to provide information on the health and environmental effects of any chemicals used? Will they provide spot treatment for specific pests as opposed to calendar spraying? Ask them to use the least-toxic pesticide and to explain the need for each application. Ask them how the pesticide will be applied and in what quantity.
What type of contract do you have? Do you have a signed written agreement or verbal agreement? How long will the service continue? Do you know how to cancel the agreement?
What type of insurance coverage is provided? What kind and how much insurance is provided to cover property damage as well as personal injury to you, your family, and others from overexposure or misapplication of pesticides?

Community Greenspace Exposure

Outdoor exposure to pesticides is not confined to the home and garden. Parks, botanical gardens, and rights-of-way are often sprayed routinely, as are golf courses, school yards, and playing fields. However, public awareness of the dangers of human exposure and threats to wildlife and the quality of soil and groundwater is growing. Finding that they can save money as well as assure a healthier environment, many communities are choosing alternative methods of pest control.

Groundwater contamination from pesticides used in agriculture has been well documented. Less research has been done on the effects on groundwater quality of the intense use of chemicals on turf, shrubs, and trees around homes and on public greenspace. In a study of golf courses on Cape Cod, 10 of the 17 pesticides used on the courses were detected in monitoring wells, though most at levels that were considered toxicologically insignificant. However, chlordane, which is no longer permitted to be used on golf courses, was found at levels which might pose health risks from prolonged exposure. [42]

Some studies have indicated that good turf management will minimize groundwater contamination. However, since good management cannot be guaranteed, experts are concerned about the problem; the more testing is conducted, the more contamination is found. The Phase II Report of the National Pesticide Survey found a strong association between the amount of dacthal used on golf courses and in urban applications and the probability of detecting degradates of this pesticide in rural and community wells.[43]

Parks

Conventional pest management in parks continues to consist of the scheduled spraying of trees and turf with pesticides. However, some progress has been made in this area in recent years. The National Park Service instituted a model cost-effective IPM program in Washington, DC, area parks in the early 1980s, cutting pesticide use by 73% in three years.[44] Since that time, the National Park Service has expanded its IPM program to include all of the parks in its system.

Many communities are now drastically reducing their pesticide use in parks. Portland and Eugene, Oregon, for example, have IPM programs in place which evaluate all other methods of control before using pesticides. These programs tightly control what pesticides are used and where. Worker training, record keeping, and safe disposal of chemicals are emphasized.

Berkeley, California, also has a very stringent pest management policy which seeks to minimize or eliminate the use of pesticides. Berkeley's program incorporates IPM concepts and includes strict controls over pesticide selection as well as notification requirements. This policy also applies to indoor pest management. The Berkeley Unified School District has adopted the city's program.

Roadsides

The median strips and shoulders of highways are often sprayed routinely to control vegetation that might grow too close to the road or that might interfere with the driver's vision. However, some counties and states have developed natural roadside programs using low, hardy, native perennials and controlling unwanted growth with mowing and spot pesticide treatments. Wisconsin and Illinois have found that this type of management can have many advantages besides the reduction of toxic releases to the environment: lower maintenance costs, less soil erosion, increased bird and wildlife numbers, and reduced energy expenditures.[45]

IPM techniques in Eugene, Oregon, parks include the use of mulches, water blasting, soapy water, traps and lures.

Credit: Eugene Parks, Recreation and Cultural Services

Credit: Charles Gouveia, Illinois Dept. of Transportation

Frankfurt Garden Club members plant wildflowers along I-80 in Illinois.

Rights-of-Way

Utility rights-of-way are sprayed to control the growth of trees and vegetation that interfere with electric and gas lines. However, some utilities, notably along the East Coast, have moved away from the policy of routine, broadcast spraying. Thirty-year studies of various methods of controlling unwanted vegetation on rights-of-way in Pennsylvania found that selective removal of trees could produce fairly stable shrub populations that resist tree invasions for 10 years or longer while improving conditions for wildlife. Utilities such as the Philadelphia Electric Company (Pennsylvania) and Northeast Utilities (Connecticut and western Massachusetts) are using IPM for their rights-of-way. They are encouraging low-growing shrubs and grasses, using mechanical or cultural methods when possible, and applying herbicides only on a selective basis to remove undesirable vegetation. Managers report that herbicide use is decreasing as the lower-growing vegetation becomes more established.[46]

Golf Courses

Heavy pesticide spraying of the approximately two million acres of golf courses in the US is potentially affecting wildlife, soil, and groundwater as well as the health of some 24 million golfers and those who live nearby. Moreover, over a thousand new golf courses are under construction or in the planning stage.

The intensity of pesticide use depends on a number of factors including the severity of the climate, the geographic location, the type of grass used and its adaptability, and the players' demands for beautifully groomed, smooth, weedless, green courses.[47] In 1982 an EPA survey found that total pesticide use on golf courses was over nine pounds per acre per year.[48]

Despite the fact that many of the health effects of the pesticides used on golf courses are still unknown, golf course managers continue to use them aggressively. Golfers are unknowingly exposed when courses do not post warning signs of pesticide applications. In New Jersey, this problem was considered serious enough to warrant a right-to-know regulation requiring courses to post signs of pesticide applications on the starting tees. In Japan, after a survey revealed that doctors attributed more than a third of agrochemical poisonings to products used on golf courses, doctors representing Japanese insurance companies called for a ban on golf course pesticide use.[49]

Some golf clubs have adopted IPM in an attempt to reduce their pesticide use and have found that they save money as well. The Pine Ridge Golf Course in Towson, Maryland, has cut its pest control budget by one-third by implementing this program.[50]

Golf course superintendents have found that better course construction, improvement of irrigation systems, and appropriate choice of grass species can help reduce dependence on spraying.[51] The Golf Course Superintendents Association of America has developed a program for the responsible use of pesticides and fertilizers. It sponsors regional seminars that deal with such subjects as disease and insect identification, community and employee right-to-know, and integrated turf management.[52]

Golf associations are attempting to educate their members in more environmentally sound methods of pest control. The US Golf Association is trying to develop new grasses that need less water and are more tolerant of pests and other environmental stresses.[53]

Despite these efforts, pesticide use on golf courses remains a serious problem and one which will be exacerbated by the growing popularity of the sport.

Credit: Maggie Knaus

Golfers are often unaware of what kinds of pesticides have been applied to courses or when they were applied.

Community Pests

Mosquitoes

Mosquitoes are a significant problem as well as a nuisance in many areas of the US. They can carry disease to both human beings and animals. Moreover, because of the widespread use of pesticides for mosquito control and for agricultural pests, they are developing multiple resistances all over the world.

In many areas of the US aerial spraying for adult mosquitoes still takes place on a routine basis despite the fact that very little pesticide sprayed from the air actually reaches mosquito populations. Communities can control mosquitoes without resorting to broadcast spraying of adult insects. Successful programs combine the elimination of breeding sites, public education, the introduction and protection of natural mosquito predators, and the spraying of mosquito larvae with Bacillus thuringiensis, *Bt*, a microbial insecticide which is more selective than chemical insecticides.

There are simple steps one can take to reduce mosquito populations around the home. Their breeding grounds — any type of standing water in neighborhood backyards — should be eliminated. Birds, bats, and insects that eat mosquitoes should be encouraged.

Gypsy Moths

The gypsy moth was accidentally introduced into the US in 1869. It is now well established in the mid-Atlantic region and the Northeast as well as in other scattered areas throughout the US including the Northwest. Gypsy moths are voracious eaters, but healthy deciduous trees can generally survive one or two attacks. Defoliation does not necessarily mean the death of the tree (except in the case of evergreens which, if defoliated once, are killed); however, a series of defoliations can be fatal.

Aerial spraying for this pest over urban and suburban areas with chemical pesticides such as Dimilin® is common. Dimilin® is extremely toxic to aquatic organisms. It is not specific to the gypsy moth and can kill parasites and predators of the gypsy moth as well as butterfly and moth caterpillars.

Because there are serious concerns about the chronic effects of Dimilin® on human health, communities are using *Bt* which is generally effective if used at the correct time. Whether it is more effective to spray aerially or from the ground depends on the climate, terrain, and other local factors.

With a knowledge of its life cycle, there are a number of steps both communities and individuals can take to protect their trees from the gypsy moth without resorting to chemical means. In the early spring, egg masses, which

Insect Repellents

The most effective commercial insect repellents contain N, N-diethyl-m-toluamide, commonly known as DEET, a toxic chemical. Human health effects range from eye irritations, contact dermatitis, and aggravated acne to seizures and coma. DEET has been implicated in several serious cases of human illness including the death of a child from repeated exposures to a 10% formulation. In 1989 the New York State Department of Health investigated five reports of seizures associated with the use of DEET, four of them involving children. Numerous incidents of pet poisonings by DEET have been reported.

DEET continues to be widely used despite the fact that huge gaps exist in the health and safety data needed to assess its risks. DEET was registered before current health and safety standards were in place, and EPA, responding to industry pressure, has several times delayed and weakened the requirements for complete health data submissions.

When another repellent, R-11, was reported in 1990 to have caused ovarian atrophy, ovarian tumors, birth defects, and testicular tumors in mice and rats, EPA reported its acceptance of a voluntary cancellation by the manufacturer and warned pregnant women of its dangers. In 1991, EPA issued a warning that use of another repellent, 2-ethyl-1, 3 hexanediol, may also pose a risk of birth defects.

Some products used to repel insects are not called repellents and therefore do not have to be registered with the EPA. Some of these are thought to be less toxic than DEET products, but very little is actually known about these alternatives.

What You Can Do

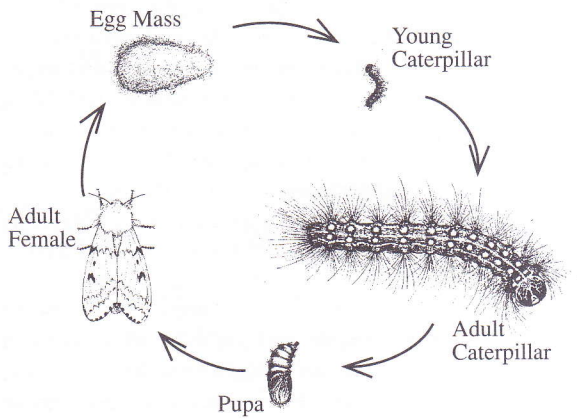
Insect repellents actually do not repel insects. Instead they cover or mask the attractants present on the human or animal body: warmth, moisture, carbon dioxide, and lactic acid.

- Clothe as much of the body as possible. Wear long sleeves and long pants and apply repellent to clothing instead of skin whenever possible.
- Use repellents sparingly and wash off carefully after coming indoors. Try to avoid inhaling the products or getting them into the eyes. Never use them near wounds or irritated skin. Do not apply repellents to children's hands as they may put them in their mouths or near their eyes.

Sources: National Coalition Against the Misuse of Pesticides, "DEET," *Pesticides and You*, August 1988. S. Oransky et al, "Seizures Temporally Associated with Use of DEET Insect Repellent - New York and Connecticut," *Morbidity and Mortality Weekly Report*, October 6, 1989. Richard A. Casagrande, "Buzz Off! Which Insect Repellents Work? An Expert Reveals the Facts," *Harrowsmith Country Life*, May/June 1990.

can cling to branches, tree trunks, firewood piles, or any place that is dark and protected, can be identified and destroyed. Keeping greenspace free of litter eliminates some of the places the egg masses can be hidden. In the spring, after the moths have reached the larval stage, trees can be banded with burlap or sticky tape to trap the caterpillars that feed at night and crawl down to the base of trees during the day. Caterpillars must be removed and destroyed every day. In the event tree loss occurs they should be replaced with those less favored by the gypsy moth.

GYPSY MOTH LIFE CYCLE



Source: Cooperative Extension Service, USDA, University of Maryland

Rats

Rats are a serious community public health problem. They can carry such diseases as plague, typhus, and rat-bite fever. They also damage property and can cause fires by chewing electrical wires. The conventional way to get rid of rats has been the use of pesticides such as warfarin and brodifacoum which cause internal hemorrhaging by preventing blood from clotting. Many rats and mice have become resistant to these standard anti-coagulants. These and other types of rat poisons should be used only with extreme care. Alternatives should be considered, especially if the household includes children or pets.

An effective rat control program must involve the entire community and consist of a variety of measures including the cleanup of food sources and trash, structural changes to rat-proof buildings, trapping, and educating inhabitants about the necessity for these strategies.[54]

Pesticide Spraying Ban: New York

Citizens for a Better Tomorrow (CBT), located in Lake Placid, New York, has promoted a complete ban of aerial pesticide spraying for black flies and mosquitoes in Adirondack State Park. CBT hopes to have this spraying completely banned by the end of 1992.

The state of New York has been aerially sprayed with toxic chemicals for over 35 years. CBT has compiled over 1,500 pages of information on the hazards of and damages resulting from aerial spraying. It has also collected signed letters from nine physicians and 13 other health professionals asking for an immediate end to the use of these toxic pesticides. CBT has repeatedly met with the New York State Department of Environmental Conservation, New York State Department of Health, New York State Attorney General's Office, and the Adirondack Park Agency, stressing less toxic alternatives.

As a result of CBT's work, accomplished in conjunction with state agencies, aerial spraying for black flies and mosquitoes did not take place in New York State during May and June of 1990. Education and public pressure has meant that more and more towns throughout New York State have ceased their aerial spraying practices and have adopted less toxic, more natural control methods.

For more information, contact Theodosia Grayson, Citizens for A Better Tomorrow, Box 305, Lake Placid, NY 12946 (518) 523-2039.

Wood Preservatives

People usually do not associate pesticides with wood preservatives, yet these preservatives account for over one-third of the pesticides used annually in the US. Wood preservatives kill insects, fungi, microbes and other organisms that naturally decompose dead wood. Most wood that is used outside is treated with some type of preservative.

The most common pesticides used are arsenic-based compounds, creosote, and pentachlorophenol (penta or PCP). All three can be applied using one of two methods for preserving wood, the pressure process or the non-pressure process. Pesticides in wood preserved by pressure treatment penetrate deeply into the wood and remain there for decades. Vapors from penta or creosote pressure-treated wood may slowly volatilize into the environment. Examples of pressure-treated wood include construction lumber, plywood, fence posts, and landscaping ties. Non-pressure treated wood is protected by spraying or brushing with preservatives and includes lumber for decks, patios, playground equipment, and lawn furniture.

Health Effects

Arsenic, penta, and creosote have been found to induce adverse skin reactions ranging from contact dermatitis to skin cancer in humans. All three can also cause damage when inhaled. EPA no longer permits the use of penta and creosote products indoors. However, penta and creosote used before 1984 may accumulate in household dust and can contribute to the total exposure of children and adults to pesticides.

Penta is intrinsically toxic and also contains a number of contaminants such as dioxins and furans that are very potent carcinogens and are always present as a result of the manufacturing process. In Kentucky, residents of log homes treated with penta were found to have elevated levels of penta in their blood and urine; the youngest children had the highest levels.[55] In addition, a 1987 study found that penta-treated wood and wood shavings that came in contact with livestock contaminated pork, chicken, and dairy products.[56]

Chemical wood preservatives are also a source of environmental contamination. In the wood treating process, the preservatives are applied to the wood and the residue drips onto the ground contaminating soil and groundwater. Indeed, more than 50 sites on the Superfund cleanup list have been included because of contamination with penta, creosote, or arsenic.[57]

Vulnerability of Children

The use of wood preservatives on decks and playground equipment poses a special problem for children. They can be exposed to preservatives while playing on treated structures if a sealant is not applied. They may pick up the chemicals on their hands and ingest the preservatives by putting their hands in their mouths. Arsenic, when ingested, appears to cause skin cancer thus posing a special risk to children when it is used on playground equipment.[58]

Prompted by a study evaluating the hazards of using wood preservatives on playground equipment, California passed a law in 1987 which banned the use of state funds to purchase equipment treated with penta or creosote. Arsenic-preserved wood must be treated with a sealant. Existing equipment must be treated with nontoxic and nonslippery sealers.

Credit: Maggie Knaus

Treated wood in playground equipment should be covered with a sealant to assure safe use.

What You Can Do

- Before buying wood, consider where the wood is to be used because untreated wood may suffice for many uses.
- When choosing a wood preservative, select a least-toxic alternative such as borax, paraffin, "Copper-8" (copper-8-quinolinolate) or copper naphthenate.
- Ask your school or recreational center if playground equipment has been treated. If so, request that a sealant be used.
- When using wood previously treated with penta or creosote, use a sealant such as shellac to reduce vapor volatilization.
- Avoid using logs treated with penta when building a log home or cabin.
- Never use treated wood for picnic tables or cutting boards.
- Do not plant fruits and vegetables in raised beds made from treated wood.
- Never burn treated wood scraps in your fireplace or woodstove.
- Take proper precautions when handling treated wood: wear gloves, long-sleeve shirts, and long pants to reduce dermal exposure; wear a dust mask and goggles when sawing to reduce inhalation exposure; wash exposed areas after skin contact with treated wood and before eating.
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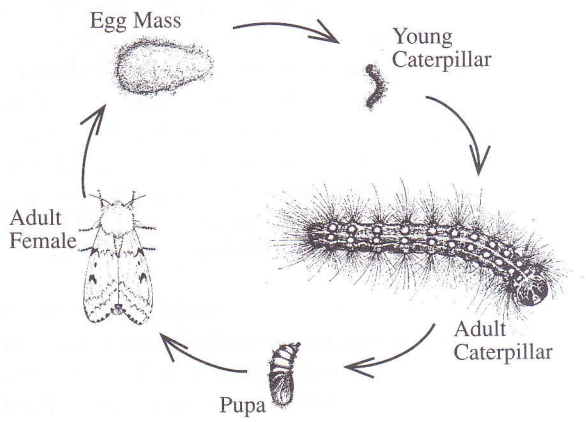

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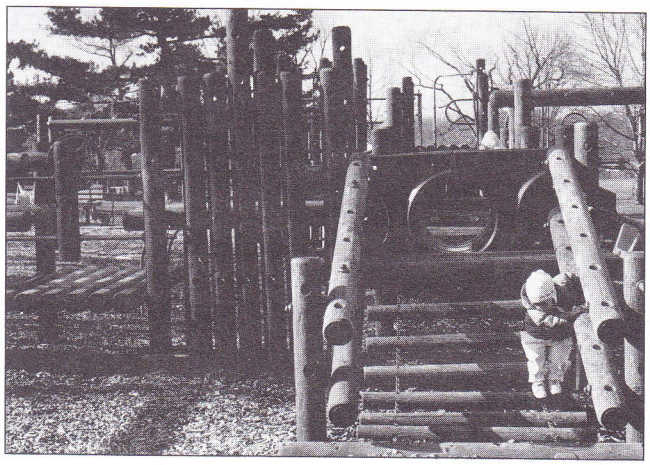

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What You Can Do in Your Community

INVESTIGATE PESTICIDE USE

- Find out what pesticides are being used in your community and where. Make a survey and map outdoor pesticide use. Find out who is doing the spraying: city, power company, railroad, military installation, lawn companies, nurseries?
- Does any one agency coordinate public area use? Is there a spray plan? Are records kept of community spraying? For how long?
- Has the community water supply been tested for pesticides? Which ones? To what level of detection? Are pesticides being manufactured or stored in your area? What provision is available for their disposal?
- What are the local pesticide regulations? Find out if there are local ordinances requiring notification of pesticide applications; if chemically sensitive individuals are given notice; if there are buffer zones around schools and playgrounds; if permits are required for aerial applications. Are these ordinances being enforced?

WORK FOR CHANGE

- Enlist the help of your neighbors, local churches, schools and universities, and citizen groups to identify and control pesticide use in public areas.Make your position known to local authorities about the use of pesticides on public lands, in school yards and playing fields, on roadsides, and rights-of-way.
- Suggest alternatives. Give local authorities examples of nonchemical methods that have worked in other communities. The county Cooperative Extension Service may be able to provide information about introducing IPM into community pest control programs.
- Work for notification requirements, stricter certification requirements for applicators, registration of the chemically sensitive, and permits for spraying.
- If you play golf, ask what pesticides are being used and insist that members are notified when spraying takes place.

WHERE TO REQUEST INFORMATION ON PESTICIDE SPRAYING

Schools

- Call the school principal who can then refer you to the contractor.
- If the principal cannot help, contact the department of facility services, office of plant operations, or school custodial operations for list of materials used.
- If you still cannot find an answer, contact the county environmental health specialist.

Neighborhood

- Call the neighbors and ask what and how much they sprayed and/or who their contractor was.
- If you are chemically sensitive, call the pesticide regulatory section of the state department of agriculture to be placed on a sensitivity list. In some states, applicators must notify you 24 hours before spraying in your vicinity.

Trees on public property

- Contact the county extension office of the state university.
- Contact the departments of consumer affairs, transportation, or public works.

Parks

- Call the park manager or the director of maintenance of that particular park or call the office of planning and evaluation in the department of recreation and parks.

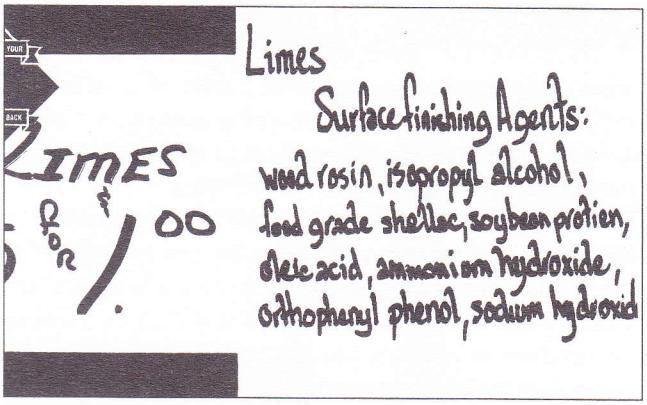
Public Buildings

- Call the administrative office of the public building to find the person responsible for maintenance who can tell you what was sprayed and who the contractor was.

Pesticide Residues on Food

For the past half century we have been putting pesticides on our food crops. In many cases, because of federally approved grading standards and marketing orders for fruits and vegetables, pesticides used on food are for cosmetic purposes only.

As a result of these practices, pesticide residues now contaminate our soil, food, drinking water, and the air we breathe. Almost all Americans have residues of the now banned pesticides DDT, chlordane, heptachlor, aldrin, and dieldrin in their bodies.[59] EPA has identified more than 70 agricultural pesticides as possible carcinogens.[60] It has estimated that residues of these pesticides on food could account for some 6,000 cases of cancer a year.[61] Other estimates are much higher. Statistics published in a 1987 National Academy of Sciences study suggested that pesticide residues could be causing as many as 20,000 cancer cases per year.[62]



This sign posted in a Merrimack, NH, supermarket illustrates the implementation of a recent state law that requires identification of post-harvest wax treatment for fruits and vegetables.

Tolerance Setting

When a pesticide is registered for use on a food crop, EPA must determine the maximum allowable residue. The residue amount, known as the tolerance level, is not protective for several reasons. It does not consider synergistic effects and it is based on insufficient testing data and outdated or inaccurate estimates about the "average" US diet. Tolerance levels also fail to take into account the special dietary habits of children, underestimating both their unique vulnerability and their consumption patterns.[63] Finally, inert ingredients are not taken into account when tolerances are set nor are tolerances revised when new data are received.[64] Like pesticide registration, tolerance setting is not a purely health-based procedure.

Monitoring Pesticide Residues

The Food and Drug Administration (FDA) is responsible for monitoring residues on food once the level has been set by EPA. In 1990 FDA tested more than 19,000 samples of domestic and imported food and reported residues on 40% of the domestic raw foods and 36% of the imported foods. Although only 1% of the residues of either category were above legal limits, [65] these limits may not be stringent enough to protect public health. In addition, analytical methods used by FDA can only detect about half of the most commonly used pesticides registered for use on food.

Very few samples are taken for testing relative to the amount of food produced or imported, and often the contaminated food reaches the market anyway. In 1986 GAO reported that in 107 of the 179 pesticide violation cases it reviewed FDA neither prevented the sale of the food on which illegal residues were detected nor penalized the growers.[66] In addition, while certain extremely toxic pesticides have been banned in the US, they can be sold abroad and often come back into this country on imported fruits and vegetables.

The Negligible Risk Controversy

The Delaney Clause of the Federal Food, Drug, and Cosmetic Act (FFDCA) bans the use of any cancer-causing pesticide in processed food. (Cancer-causing pesticides may be used on raw produce if they do not concentrate when the food is processed.) Despite the fact that this law has been in effect since 1958, the Delaney Clause has only recently been implemented in regard to a few new pesticides and not for the large number of older ones. It is, however, at present the only protection we have against cancer-causing pesticides which concentrate in processed food.

Over the years, Congress, at the urging of agribusiness, the chemical industry, and food processors, has repeatedly tried to gut the Delaney Clause. One such attempt proposed in 1988 would replace the Delaney Clause with a standard which would allow the use of carcinogens on food if the risk of contracting the disease is "negligible," or one additional cancer per one million people. Although this proposal has not become law, there are a number of instances where EPA has applied this standard for carcinogens. Critics of this policy point out that, since risk assessment is a flawed and highly questionable procedure and the addition of carcinogens to our food supply is not in the public interest, Congress should ban the use of cancer-causing pesticides on food crops rather than legitimize their use.

Signs of Progress

There are a number of encouraging developments which may assure the American public of a safer food supply. US consumers are becoming more aware of the dangers of pesticide exposure through food and are increasing the demand for pesticide-free food. Introductions of organically grown foods into markets have increased more than 400% in the last five years[67] as the number of farmers practicing sustainable agriculture grows. Some food chains are now doing their own testing for residues to reassure customers that their produce at least meets government standards or contains no detectable residues.

Many Americans are growing their own food without pesticides. A poll conducted for *Organic Gardening* in 1991 found that more than 60% of the nation's backyard vegetable gardeners use no pesticides. This represents a 15% increase in the number of organic gardeners in two years. [68]

Credit: Clemens Kalischer

Organic produce is grown on Indian Line Farm for the neighboring community.

A provision of the 1990 Farm Bill requires the adoption of a standard for certification of organic food so that shoppers will have the assurance when they buy any food labelled "organic" that it meets certain consistent, nationwide criteria.

Pesticide use on food crops can be reduced significantly. The Natural Resources Defense Council (NRDC) studied nine US crops and found that pesticide use on them could be reduced by 25-80% using currently available alternative agricultural methods.[69] NRDC also has documented that, in case after case, despite the dire predictions of agribusiness and industry, the banning of particular pesticides considered essential for specific crops has had little adverse effect on the quality or quantity of those crops.[70]

Nor would a significant reduction in pesticide use necessarily lead to substantial increases in food prices. According to a 1991 Cornell University study, food prices would increase less than one percent if alternative pest control methods were substituted for half of the chemical pesticides now used in the nation's agricultural production.[7] Much more attention to and federal and state funding for sustainable agricultural techniques that assure the conservation of environmental resources and the protection of public health must be forthcoming.

Community Supported Agriculture: Massachusetts

Indian Line Farm, located in South Egremont, Massachusetts, represents a new approach to providing organic, pesticide-free produce to the surrounding community. Five acres of the farm are leased to a program called Community Supported Agriculture (CSA). Interested members in the community become shareholders in the program by paying a set fee which is their share of production costs. Shareholders pay this fee in advance for a 10-month supply of produce. Both consumers and producers share the risks of a bad season as well as the benefits of a bumper crop.

From May through October shareholders receive a weekly supply of an average of 5-7 pounds of fresh produce. From November through March they receive a once-a-month supply of vegetables from the root cellar. The cost for the produce is competitive with supermarkets in the area. In 1990 Indian Line Farm's CSA project sold 85 shares to approximately 200 people. There are currently more than 200 CSA projects throughout the US. If the current rate of CSA growth continues, it is estimated that there will be 5,000 CSA projects by the year 2000.

For more information, contact Robyn Van En, CSA, R.R. 3 Box 85, Great Barrington, MA 01230 (413) 528-4374.

What You Can Do

- Buy organic produce.
- Buy produce grown locally and in season.
- Encourage local growers to reduce pesticide use.
- Ask your supermarket to carry organically grown food.
- Request that it label the produce it carries as to what pesticides are contained in the waxes used in post harvest treatment.
- Write your Congressional representatives and express your views on the need to strengthen our pesticide laws.
- To reduce the danger of exposure to pesticides on food, wash vegetables and fruits thoroughly in water (this will remove some residues) and peel those you can.

Regulatory Problems

Weaknesses in Federal Laws

Two federal laws guide the major regulation of pesticides: the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), administered by EPA, and the Federal Food, Drug, and Cosmetic Act (FFDCA), administered by the Food and Drug Administration (FDA).

When originally passed in 1947, FIFRA was intended to protect farmers from ineffective products. At that time, under the authority of the US Department of Agriculture (USDA), only pesticides shipped in interstate commerce were registered, and no testing for long-term health effects was required. Amendments passed in 1972 shifted regulatory authority to the newly formed EPA and required that all pesticides used in the US be registered for specific uses on the basis of test results, including long- and short-term toxicological data. All previously registered pesticides were to be reregistered with these requirements.

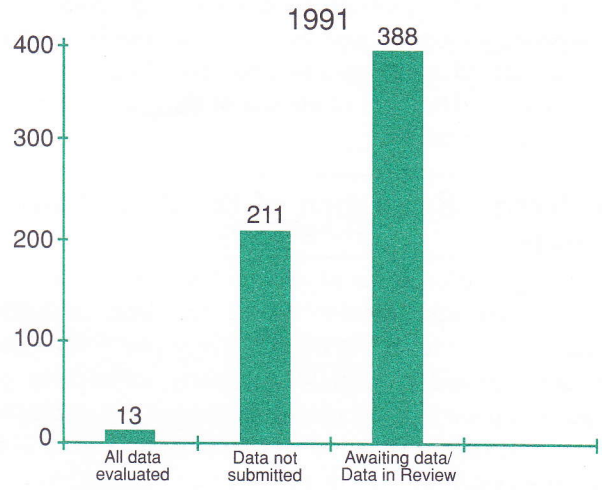
Little progress had been made by 1988. At that time FIFRA was reauthorized. It set a nine-year deadline for the testing of the roughly 600 groupings of active ingredients used in most pesticides. For the first time it required manufacturers to pay fees for the registration of pesticides. It repealed a former provision in FIFRA which had required EPA to pay manufacturers, distributors, and dealers for existing stocks of a pesticide banned by EPA, a provision which had discouraged EPA from cancelling many uses of pesticides. The current law, however, is still not adequate to protect human health or the environment since all pesticide product ingredients are neither fully tested nor disclosed. Many loopholes still exist which allow the use of dangerous poisons throughout the community. Extensive reform is urgently needed, especially in the area of groundwater protection.

Under FFDCA, FDA is directed to enforce the residue levels for food set by EPA, to seize or condemn foods containing residues which exceed those levels, and to invoke criminal penalties when necessary. FDA uses two methods to monitor food (except for meat and poultry which are inspected by USDA): general inspection of approximately 10,000 domestic samples from shipments per year (a minuscule amount of the total food shipped in the US), and the annual "market basket survey" intended to assess the total intake of pesticides in the US diet.

Deficiencies in the Registration Process

FIFRA requires that a pesticide pose "no unreasonable risk" if used as directed. The system used to determine whether the risk is unreasonable or not is called "risk-benefit analysis." It involves a complex process of weighing the economic and social benefits of the use of each pesticide against the risk of environmental degradation and human illness. The fact that the benefits are often merely cosmetic, as in the case of lawn care pesticides, makes some of these analyses questionable at best. In addition, the benefit side of the equation is weak. GAO has found that EPA's estimates of benefits are often based on poor or nonexistent data and fail to consider promising alternatives.[72] Registration decisions therefore are not based on the primary consideration of health.

STATUS OF REREGISTRATION OF PESTICIDES



Source: *Pesticide Reregistration Progress Report*, EPA 700-R-92-001, Jan. 1992.

The EPA registration process is a protracted one involving review of health and safety data provided by the manufacturers of the products. Federal law does not require testing for long-term health effects on a pesticide's full formulation, only on the active ingredient. In addition, EPA has the latitude to waive some types of testing for specific-use pesticides. All pesticides do not have to pass all tests.

Assessing hazard includes data review from experiments on animals and epidemiological studies. Both have serious drawbacks, paramount among which is the difficulty of extrapolating results of animal tests to human health concerns. In addition, some experts believe that the use of quantitative risk assessments renders the results questionable. The process is also skewed by a lack of knowledge about the synergistic effects of exposure to multiple chemicals and the lack of disclosure of inert ingredients for which the risks cannot be calculated.

The end result of the registration process is the label on the pesticide container which is the primary source of information for the consumer about the hazards and use of

the product. It is supposed to include the ingredients, warnings, and complete instructions for application, first aid, storage, and disposal. Labels are often inadequate because of data gaps and because they rarely include chronic hazard warnings. In addition, they are often difficult to read because of the size of the print and/or the color of the container.

Ineffective Regulation of the Pest Control Industry

A large percentage of pesticides are applied by professional applicators. There are over 300,000 commercial applicators in the US. Every year people and pets are poisoned by pesticides properly, improperly, or illegally applied by pest control companies. For example, a California applicator failed to provide a homeowner with written warning about diazinon before application and was ordered to pay damages;[73] a Virginia jury found a pest control company guilty of illegally applying chlordane to a client's condominium;[74] and a San Diego jury found an exterminating company liable and guilty of gross negligence after it sprayed city hall with Dursban® while the building was occupied and without notifying employees in advance.[75]

Numerous state and federal agencies share responsibility for regulating the pest control industry and the chemicals it uses.[76] Under FIFRA, EPA is authorized to restrict the use of particularly toxic pesticides to persons certified by EPA (or by states with delegated authority) as being competent in the use and handling of pesticides. These people are called certified applicators. Noncertified persons are also able to use restricted-use pesticides if they work under the "direct supervision" of a certified applicator. However, EPA states that a supervisor need not always be physically present to provide "direct supervision." In addition, restricted-use pesticides usually may only be sold to certified applicators. Most restricted-use pesticides covered by the above guidelines are registered for and used mainly for agricultural purposes. Unrestricted pesticides are used by the majority of pest control applicators who are thus not required by FIFRA to be certified.

Most state governments are responsible for training and licensing applicators and enforcing the federal law. At the state level, regulation of the pest control industry varies greatly. In several states, controls over restricted-use pesticide applicators are more stringent than at the federal level. For example, Texas law requires a licensed applicator to be physically present during application of any restricted pesticide.[77] At least 40 states have regulations for applicators of unrestricted pesticides to ensure that they perform competently. Requirements, which may or may not include licensing, can range from a written exam, to classroom training and an exam, to actual training or experience with specific types of pesticide applications, such as fumigants or termiticides. In many states, however, certification procedures are not adequate.

While an administrative system which provides checks and balances within an individual state is often an advantage, the overlapping roles of various agencies in the regulation of the pest industry may be a problem. For example, in Texas responsibility is shared by the Structural Pest Control Board, the Texas Department of Agriculture, and the Texas Department of Health. This overlap can result in varying levels of experience among applicators, expensive duplication of effort, and confusion over who is responsible for enforcement. In all states, however, if after 30 days the appropriate agency has failed to act, citizens can appeal to the regional EPA office, which has the power to deal with enforcement when state agencies fall short.

Many states do not require record keeping of pesticide use nor do they keep track of poisoning incidents. Since funding was withdrawn in 1981 for EPA's Pesticide Incident Monitoring System, no federal agency keeps poisoning records.[78] Few doctors are trained to recognize symptoms of pesticide poisonings — which often resemble the symptoms of flu — so that the few existing records are not likely to be accurate. Only a few states require health care professionals to report suspected poisonings as illnesses to the state.

False Claims

In 1986 a GAO study found that pest control applicators often make false or misleading claims about the safety of their products or services.[79] These claims often lead consumers to believe that the pesticides used are safe. In fact, the chronic health and environmental risks from using these products have not been adequately evaluated. In addition, false and misleading claims often encourage consumers to purchase services they might not otherwise use. Under FIFRA, EPA's enforcement authority against false advertising applies only to pesticide manufacturers, not to pest control companies. While the Federal Trade Commission (FTC) has the authority to take action against applicators, it seldom does so. In a follow-up study in 1990, GAO reported that neither EPA nor FTC had acted on recommendations for controlling the inappropriate claims of pesticide applicators.[80]

Inadequate Insurance

Finally, consumers may not be adequately insured against pesticide misuse by professional applicators. Many company liability insurance policies contain pollution exclusion clauses which absolve applicators of responsibility for personal or property damage resulting from pesticide application.[81] Recently, some states such as Maryland have passed legislation to ensure that the pest control companies are held responsible for deliberate misuse and/or negligent pesticide application. Unfortunately, liability often does not cover the full extent of the loss.

How To Write Members of Congress

Letters to members of Congress are effective. Senators and Congressional Representatives keep records of their mail and pay close attention to the interests of their constituents.

Personal letters are much more effective than form letters. They should be focused on a single issue, factual, and not longer than two typed pages. Be sure your name and address are clearly legible.

Remember also to write your state representatives.

Sample Letter

Date

The Honorable_____
US Senate (or US House of Representatives)
Washington, DC 20510 (20515 for House)

Dear Senator (or Representative)_____:

- Briefly state why you are writing and what, specifically, you are asking of your senator or representative. Give the relevant bill number and name. Ask for her/his position on the bill.
- Explain why the issue is important. Give facts. Describe how it affects you, your community, and/or your state.
- Thank your senator or representative and request an answer to your letter.

Sincerely,

Name
Title and Organization (if appropriate)
Address and Phone (if not on letterhead)

Information Sources

To express your views on an issue:
WHITE HOUSE (202) 456-1111

To reach a member of Congress, a committee, or subcommittee:
US CAPITOL SWITCHBOARD (202) 224-3121

To obtain information about federal legislation:
OFFICE OF LEGISLATIVE INFORMATION (202) 225-1772

To obtain copies of bills and reports:

House Document Room
B-18 Annex 2
Washington, DC 20515
(202) 225-3456

Senate Document Room
SH-B 04
Washington, DC 20510
(202) 224-7860

To obtain issue briefs prepared by the Congressional Research Service of the Library of Congress:
Contact your Senator or Representative.

Resources

National Organizations

Center for Science in the Public Interest
1875 Connecticut Avenue NWSuite 300
Washington, DC 20009(202) 332-9110

Concern, Inc.
1794 Columbia Road NW, Suite 6
Washington, DC 20009
(202) 328-8160

National Audubon Society
666 Pennsylvania Avenue SE
Washington, DC 20003
(202) 547-9009

National Coalition Against the Misuse of Pesticides (NCAMP)
701 E Street SE, Suite 200
Washington, DC 20003
(202) 543-5450

Natural Resources Defense Council
71 Stevenson Street, Suite 1825
San Francisco, CA 94105
(415) 777-0220

Northwest Coalition for Alternatives to Pesticides (NCAP)
P.O. Box 1393
Eugene, OR 97440
(503) 344-5044

Pesticide Action Network
North American Regional Center
965 Mission Street, Suite 514
San Francisco, CA 94103
(415) 541-9140

Public Citizen
215 Pennsylvania Avenue SE
Washington, DC 20003
(202) 546-4996

Rachel Carson Council, Inc.
8940 Jones Mill Road
Chevy Chase, MD 20815
(301) 652-1877

Regional and Local Organizations

Arizona
Arizona Toxics Information
P.O. Box 1896
Bisbee, AZ 85603
(602) 432-7340

California
California Action Network (CAN)
P.O. Box 464
Davis, CA 95617
(916) 756-8518

Pesticide Watch
11965 Venice Boulevard, Suite 408
Los Angeles, CA 90066
(310) 391-8151

Colorado
Colorado Pesticide Network
P.O. Box 6108
Denver, CO 80206
(303) 688-4431

Connecticut
Connecticut Fund for the Environment
1032 Chapel Street
New Haven, CT 06510
(203) 787-0646

Florida
MannaSota-88
5314 Bay State Road
Palmetto, FL 34221
(813) 722-7413

Illinois
Citizens for a Better Environment
407 S. Dearborn Street, Suite 1775
Chicago, IL 60605
(312) 939-1530

Kansas
Kansans for Safe Pest Control
R.R. 5, Box 163
Lawrence, KS 66046
(913) 748-0950

Maine

Maine Audubon Society
P.O. Box 6009
Falmouth, ME 04105-6009
(207) 781-2330

Maryland
Montgomery County Environmental Network
7201 Glenbrook Road
Bethesda, MD 20814
(301) 657-8745

Massachusetts
Massachusetts Audubon Society
South Great Road
Lincoln, MA 01773
(617) 259-9500

Michigan
Ecology Center of Ann Arbor
417 Detroit Street
Ann Arbor, MI 48104
(313) 761-3186

New Jersey
New Jersey Coalition for Alternatives to Pesticides (NJCAP)
P.O. Box 627
Boonton, NJ 07005
(201) 334-7975

New York
New York Coalition for Alternatives to Pesticides
33 Central Avenue
Albany, NY 12210
(518) 426-8246

North Carolina
Agricultural Resource Center Pesticide Education Project
115 W. Main Street
Carrboro, NC 27510
(919) 967-1886

Ohio
Ohio Coalition Against the Misuse of Pesticides
2128 Halcyon Road
Beachwood, OH 44122
(216) 382-4341

Pennsylvania
Grass Roots the Organic Way
38 Llangollen Lane
Newtown Square, PA 19073
(215) 353-2838

Rhode Island
Rhode Island Group for Alternatives to Spraying Pesticides (RIGASP)
43 Greenway Street
Cranston, RI 02910-5913
(401) 467-4468

Texas
Pesticide Issues
Lone Star Chapter of the Sierra Club
2502 Albata Avenue
Austin, TX 78757
(512) 459-8063

Washington
Washington Toxics Coalition
4516 University Way NE
Seattle, WA 98105
(206) 632-1545

Wisconsin

Madison Audubon Society
222 S. Hamilton Street, Suite 1
Madison, WI 53703
(608) 255-2473

Health

Human Ecology Action League (HEAL)
P.O. Box 49126
Atlanta, GA 30359
(404) 248-1898

National Center for Environmental Health Strategies (NCEHS)
1100 Rural Avenue
Voorhees, NJ 08043
(609) 429-5358

National Network to Prevent Birth Defects
P.O. Box 15309
Southeast Station
Washington, DC 20003
(202) 543-5450

Hotlines

National Pesticides Telecommunications Network
(800) 858-7378 (24 hours/ 7 days)

Integrated Pest Management

Bio-Integral Resource Center
P.O. Box 7414
Berkeley, CA 94707
(510) 524-2567

Organic Farming

Institute for Alternative Agriculture
9200 Edmonston Road, Suite 117
Greenbelt, MD 20770
(301) 441-8777

International Alliance for Sustainable Agriculture
1701 University Avenue SE
Minneapolis, MN 55414
(612) 331-1099

Maine Organic Farmers and Gardeners Association
P.O. Box 2176
Augusta, ME 04338
(207) 622-3118

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About CONCERN

CONCERN, Inc. is a non-profit, tax-exempt organization, founded in 1970, that provides environmental information to individuals and groups and encourages them to act in their communities. The primary activity of this organization is the publication and distribution of reports which define key environmental issues and contain suggestions for individual and group action. Further support is offered through an active community outreach program. CONCERN's projects are supported by private grants and individual contributions.

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